



VOL- 45 Pt-1.

JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL.

• 957/
• 002/5

Part I.—HISTORY, LITERATURE, &c.

No. I.—1876.

The Prologue to the Rāmāyana of Tulsi Dās. A Specimen translation.

—By F. S. GROWSE, M. A., B. C. S.

The Sanskrit Rāmāyana of Vālmīki has been published more than once, with all the advantages of European editorial skill and the most luxurious typography. It has also been translated both in verse and prose, and—in part at least—into Latin as well as into Italian and English. The more popular Hindi version of the same great national Epic can only be read in lithograph or bazar print, and has never been translated in any form into any language whatever. Yet it is no unworthy rival of its more fortunate predecessor. There can of course be no comparison between the polished phraseology of classical Sanskrit and the rough colloquial idiom of Tulsi Dās's vernacular, while the antiquity of Vālmīki's poem further invests it with an adventitious interest for the student of Indian history. But on the other hand the Hindi poem is the best and most trustworthy guide to the popular living faith of the Hindu race at the present day—a matter of not less practical interest than the creed of their remote ancestors—and its language, which in the course of three centuries has contracted a tinge of archaism, is a study of the greatest importance to the philologist, since it serves to bridge an otherwise impassable chasm between the modern style and the mediæval. It is also less wordy and diffuse than the Sanskrit original, and—probably in consequence of its modern date—is less disfigured by wearisome interpolations and repetitions; while, if it never soars so high as Vālmīki in some of his best passages, it maintains a more equable level of poetic diction and seldom sinks with him into such dreary depths of

unmitigated prose. It must also be noted that it is in no sense a translation of the earlier work: the general plan and the management of the incidents are necessarily much the same, but there is a difference in the touch in every detail; and the two poems vary as widely as any two dramas on the same mythological subject by two different Greek tragedians. Even the coincidence of name is an accident; for Tulsi Dás himself called his poem "The Rám-charit-mánas", and the shorter name, corresponding in form to the Iliad or Æneid, was only substituted by his admirers as a handier designation for a popular favourite.

The passage, of which a translation is here submitted, forms the Introduction to the first book. It is at once of less obvious interest and also of much greater difficulty than the narrative portions of the poem. It is valuable, however, as a resumé of popular Hindu theology and metaphysics, and it supplies some personal details of the author's life. Thus we learn from it that he studied at Soron, and commenced writing at Ayudhyá on the festival of Ráma's birthday in the Sambat year 1631, corresponding to 1575, A. D. We need not suppose that he remained long at Ayudhyá, for according to tradition the main body of the poem was composed at Chitrakút. His vindication of himself against his critics is a curious feature. They attacked him for lowering the dignity of his subject by clothing it in the vulgar vernacular. However just his defence may be, it did not succeed in converting the opposite faction; and the professional Sanskrit Pandits, who are their modern representatives, still affect to despise his work as an unworthy concession to the illiterate masses. With this small and solitary exception the book is in every one's hands, from the court to the cottage, and is read or heard and appreciated alike by every class of the Hindu community, whether high or low, rich or poor, young or old. The purity of its moral sentiments and the absolute avoidance of the slightest approach to any pruriency of idea—which the author justly advances among his distinctive merits—render it a singularly unexceptionable text-book for native boys. For several years past I have persistently urged its adoption upon the Education Department, and—thanks to Rájá Siva Prasád—extracts from it have now been introduced into our primary schools. It has always been prescribed as the principal test in the Civil Examination for High Proficiency and a Degree of Honour; and it is equally well adapted for both these apparently incongruous purposes. For a Hindu child generally grasps at once the familiar idiom and finds no great difficulty in even the most crabbed passage; while on the other hand both the terminology and the syntactic collocation of the words are in the highest degree perplexing to the European student. The reason is, that an English official as a rule knows only the language of the courts, and has never studied the vernacular of the people: for which neglect he has hitherto had much excuse in the

1876.] F. S. Growse—*The Prologue to the Rámáyana of Tulsi Dás.* 3

absence both of a Dictionary and a Grammar. The former want is in course of being supplied by Dr. Fallon ; and the latter by Mr. Kellogg of the Allahabad Mission, who has nearly completed a work that promises from the pages I have seen, to be in a remarkable degree both lucid and exhaustive.

It will, I think, be admitted that a poem of such manifold interest should no longer be withheld from the English reader ; and the advantages in the way of criticisms and suggestions which I hope to secure from its being generally known that a translation is in progress will, I trust, be a sufficient excuse for occupying so many pages with the following specimen. The notes that I have added are more explanatory than would be required by the members of a learned Society, but they may be found useful by the general public, and I have therefore retained them in their place ; since I would have the specimen represent as closely as possible the exact form which it is intended the complete work should assume.

BOOK I.—CHILDHOOD.

Sanskrit Invocation.

I reverence the Goddess of Speech and the Divine Guide,* who are the inventors of the alphabet ; of multiform expression ; of the poetic modes and of metre. I reverence Bhaváni and Sankara, the incarnation of Faith and Hope, without whom not even the just can see God the great Spirit. I reverence as the incarnation of Sankara the all wise Guru, through whom even the crescent moon is everywhere honoured.† I reverence the king of Bards‡ and the Monkey-king, of pure intelligence, who ever lingered with delight in the holy forest land of Ráma and Sítá's infinite perfection. I bow before Sítá, the beloved of Ráma ; the queen of birth, of life and death ; the destroyer of sorrow ; the cause of happiness. I reverence, under his name of Ráma, the Lord Hari ; supreme over all causes ; to whose illusive power are subject the whole universe and every supernatural being from Brahma downwards ; by whose light truth is made manifest, as when what appeared to be a snake turns out a rope ; and by whose feet as by a bark those who

* By *Váni*, the goddess of speech and *Vináyaka*, the guide, are certainly intended the divinities ordinarily so designated, viz. Sarasvati and Ganesa. The translation, however, leaves it open ; since some of the Hindu commentators conceive that in this particular passage the reference is rather to Sítá and Lakshman.

† The crescent moon, being one of Sankara's (i. e. Siva's) constant symbols, is honoured on his account, though in itself imperfect ; while the full moon is honoured for its own sake.

‡ The king of bards is Válmíki, the reputed author of the Sanskrit Rámáyana. The monkey king is of course Hanumán, and the two are brought together more on account of the close similarity of name than for any other reason ; *Kavíśvara* and *Kapíśvara* differing only by a single letter.

will, may pass safely over the ocean of existence. In accord with all the Puránas and different sacred texts and with what has been recorded in the Rámáyana (of Válmíki) and elsewhere, I Tulsi to gratify my own heart's desire have composed these lays of Raghunáth in most choice and elegant modern speech.

Sorathá 1.

O Ganes of the grand elephant head, the mention of whose name ensures success, be gracious to me, accumulation of wisdom, store-house of all good qualities ! Thou too, by whose favour the dumb becomes eloquent and the lame can climb the vastest mountain, be favourable to me, O thou that consumest as a fire all the impurities of this iron age. Take up thy abode also in my heart, O thou that slumberest on the milky ocean, with body dark as the lotus and eyes bright as the water lily. O spouse of Uma, clear of hue as the jasmine or the moon, home of compassion, who shewest pity to the humble, shew pity upon me, O destroyer of Kámadeva. I reverence the lotus feet of my master, that ocean of benevolence, Hari incarnate, whose words are like a flood of sunlight on the darkness of ignorance and infatuation.*

Chaupái.

I reverence the pollen-like dust of the lotus feet of my master, bright, fragrant, sweet and delicious ; pure extract of the root of ambrosia, potent to disperse all the attendant ills of life ; like the holy ashes on the divine body of Sambhu, beautiful, auspicious, ecstatic. Applied to the forehead as a *tilak*, it cleanses from defilement the fair mirror of the human mind and enriches it with all the virtues of the Master. By recalling the lustre of the nails of the reverend guru's feet, a divine splendour illumines the soul, dispersing the shades of error with its sun-like glory. How blessed he who takes it to his heart ! the mental vision brightens and expands, the night of the world with its sin and pain fades away ; the actions of Ráma,† like diamonds and rubies, whether obvious or obscure, all alike become clear, in whichever direction the mine is explored.

Dohá 1.

By applying this collyrium as it were to the eyes, all good and holy men see and understand his sportive career when on earth, on mountain or in forest, and all the treasures of his grace.

* The persons addressed in this stanza are Ganes, Sarasvati, Náráyan, and the poet's own spiritual instructor, or guru.

† The simple actions are compared to rubies, which may be picked up on the surface of the ground ; the mysterious actions to diamonds, which have to be dug out of a mine.

Chaupái.

The dust of the guru's feet is a soft and charming collyrium, like ambrosia for the eyes, to remove every defect of vision. With this having purified the eyes of my understanding, I proceed to relate the actions of Ráma, the redeemer of the world. First I reverence the feet of the great Brahman saints, potent to remove the doubts engendered by error. In my heart as with my voice I reverence the whole body of the Faithful, mines of perfection; whose good deeds resemble the fruit of the cotton-plant in austerity, purity, and manifold uses, and in painful cleansing from impurities: reverence to them, whatever the age or clime in which their glory was consummated. An assembly of the saints is all joy and felicity, like the great *tirath* Prayág endowed with motion; for faith in Ráma is as the stream of the Ganges; contemplation on Brahma as the Sarasvati; and ritual, dealing with precepts and prohibitions for the purification of this iron age, as the sun-god's daughter the Jamuná. The united flood of the Tribeni is represented by the legends of Hari and of Hara, filling all that hear with delight: the sacred fig tree by faith firm in its own traditions; and Prayág itself by the assembly of the virtuous. Easy of access to all, on any day, at any place, curing all the ills of pious devotees, is this unspeakable, spiritual chief *tirath*, of manifest virtue and yielding immediate fruit.

Dohá 2.

At this Prayág of holy men, whoever hears and understands and in spirit devoutly bathes, receives even in this life all four rewards.*

Chaupái.

In an instant behold the result of the immersion; the crow becomes a parrot and the goose a swan. Let no one marvel at hearing this, for the influence of good company is no mystery. Válmíki, Nárad and the jar-born Agastya† have told its effect upon themselves. Whatever moves in the water or on the earth or in the air; every creature in the world, whether animate or inanimate, that has attained to knowledge, or glory, or salvation, or power,

* The four rewards are *káma*, *artha*, *dharma*, *moksha*; that is, pleasure, wealth, religious merit, and final salvation.

† Válmíki confessed to Ráma that he had once been a hunter and had taken the life of many innocent creatures, till he fell in with the seven Rishis, who converted him and taught him to express his penitence by constantly repeating the word *mara*, *mara*. As this is Ráma read backwards, it acted as a spell and advanced him to the highest degree of sanctity.

Similarly Nárad confessed to Vyása, the author of the Puránas, that he was by birth only the son of a poor slave-girl, and had become a saint simply by eating the fragments of food left by the holy men who frequented his master's house.

Agastya also declared to Mahádeva that by birth he was the meanest of all creatures, and had only attained to miraculous powers by the influence of good company.

or virtue, by any work, at any time or place, has triumphed through association with the good; neither the world nor the Veda knows of any other expedient. Intercourse with the good is attainable only by the blessing of Ráma, and without it wisdom is impossible: it is the root of all joy and felicity, its flowers are good works and its fruit perfection. By it the wicked are reformed, as by the touch of the philosopher's stone a vile metal becomes gold. If by mischance a good man falls into evil company, like the jewel in a serpent's head, he still retains his character. Brahma, Vishnu, Mahádeva; the wisest of the poets; all have failed to describe the supremacy of virtue; for me to tell it is as it were for a costermonger to expatiate on the excellence of a set of jewels.

Dohá 3-4.

I reverence the saints of equable temperament, who regard neither friend nor foe; like a gracious flower which sheds its fragrance alike on both infolding hands.* Ye Saints, whose upright intention, whose catholic charity and whose ready sympathy I acknowledge, hear my child-like prayer, be gracious to me and inspire me with devotion to the feet of Ráma.

Chaupái.

Again, I would propitiate those saintly wretches† who without a cause swerve right or left; with whom a neighbour's loss is gain; who rejoice in desolation and weep over prosperity; who are as an eclipse to the full-moon glory of Hari and Hara; who become as a giant with a thousand arms to work another's woe; who have a thousand eyes to detect a neighbour's faults, but, like flies on *ghi*, settle on his good points only to spoil them; quick as fire, relentless as hell; rich in crime and sin as Kuver is in gold; like an eclipse for the clouding of friendship, and as dead asleep as Kumbha-karan‡ to everything good; if they can do any injury, as ready to sacrifice themselves as hailstones, that melt after destroying a crop; spiteful as the great serpent, with a thousand tongues; and like Prithuráj,§ with a thousand ears, to tell and hear of others' faults; like the thousand-eyed Indra, too, ever delighting in much strong drink and in a voice of thunder.

* Though the right hand is the one by which it has been plucked, and the left that in which it is held and preserved.

† In the following lines the poet defends himself by anticipation against possible objections, and roundly abuses the whole army of critics.

‡ Rávan's gigantic brother, Kumbha-karan, obtained as a boon from Brahmá, that whenever he had satisfied his voracious appetite, the slumber of repletion might be of the longest and deepest, and that he might only wake to eat again.

§ It is not related that Prithuráj had really ten thousand ears, but only that he prayed that he might be as quick to hear whatever redounded to the glory of God as if his ears were so many.



Dohá 5.

I know when they hear of philosophers, who regard friend and foe both as friends, they are enraged ; but I clasp my hands and entreat them piteously.

Chaupái.

I have performed the rôle of supplication, nor will they forget their part. However carefully you may bring up a crow, it will still be a crow and a thief. I propitiate at once the feet of saints and sinners, who each give pain, but with a difference : for the first kill by absence, while the second torture by their presence : as opposite as a lotus and a leech, though both alike are produced in water. Good and bad thus resemble nectar and intoxicating drink, which were both begotten by the one great ocean : * each by its own acts attains to pre-eminence ; the one in glory, the other in disgrace : compare with the good, ambrosia, or the moon, or the Ganges ; and with the bad, poison, or fire, or the river Karmnásá. Virtue and vice may be known to all by their natural development.

Dohá 6.

The good acquire goodness, and the vile vileness. Thus ambrosia has its proper effect in immortality, and poison has its effect in death.

Chaupái.

swell
swells on ~~the~~ enumerate the faults and defects of the bad and the virtues of
he is reckoned as vice, improperly and from want of discrimination.

voice
low
Rí • The churning of the ocean is one of the common-places of Hindu poetry, and the
visions to it in the Rámáyana are innumerable. With mount Mandara as a churning-
stick, the great serpent Vásuki as a rope, and Náráyan himself in tortoise-form as the
pivot on which to work, the gods and demons combined to churn the milky ocean.
Thus were produced from its depth the moon ; the sacred cow, Surabhi or Káma-dhe-
nu ; the goddess of wine, Varuni ; the tree of Paradise, Párijáta, or Kalpa-taru ; the
heavenly nymphs, the Apsarás ; the goddess of beauty, Lakshmi or Sri ; and the
physician of the gods, Dhanvantari. The cup of nectar which the latter held in his hand
was seized and quaffed by the gods ; while the poison, which also was produced, was ei-
ther claimed by the snake gods, or swallowed by Mahádeva ; whence comes the blackness
of his throat, that gives him the name of *Nil Kanth*.

lord of life ; rich and poor ; the beggar and the king ; Kási and Magadha ;* the Ganges and the Karmnásá ; the desert of Márwár and the rich plain of Málwá ; the Bráhmaṇ and the butcher ; heaven and hell ; sensual passion and asceticism ; the Vedas and the Tantras, and every variety of good and evil.

Dohá 7.

The creator has made the universe to consist of things animate and inanimate, good and evil : a saint like a swan takes the milk of goodness and rejects the worthless water.†

Chaupái.

When the creator gives men this faculty of judgment, they abandon error and become enamoured of the truth ; but conquered by time, temperament, or fate, even the good, as a result of their humanity, may err from virtue ; but Hari takes their body so to speak and corrects it, and removing all sorrow and sin cleanses it and glorifies them. If the bad through intercourse with the good do good, their inherent badness is not effaced. An impostor of fair outward show may be honoured on account of his garb, but in the end he is exposed and does not succeed ; like Kála-nemi, or Rávan, or Ráhu.‡ The good are honoured notwithstanding their mean appearance, like the bear Jamavant or the monkey Hanumán. Bad company is loss and good company is gain ; this is a truth recognized both by the world and the Veda. In company with the wind the dust flies heavenwards ; if in company with water, it becomes mud and sinks. According to the character of the arms to which a parrot or *maina* is trained, it learns either to repeat the words of the neighbour's Ráma or to give abuse. With the ignorant, soot is mere refuse, but with the wise, it may make good ink and be used even for copying a Purána ; while fire, and air combined become an earth-refreshing rain-cloud.

Dohá 8-11.

The planets, medicines, water, air, clothes, all are good or bad according as their accompaniments are good or bad ; and people observe this distinction. Both lunar fortnights are equal as regards darkness and light ; but a difference in name has been wisely made, and as the moon waxes or wanes the fortnight is held in high or low esteem. Known

* Magadha (Bihár) is taken as the opposite to Kási, in consequence of its being the birth-place of Buddhism.

† To the swan (*váj-hana*) is ascribed the fabulous faculty of being able to separate milk from water, after the two have been mixed together.

‡ Kála-nemi by assuming the form of an ascetic imposed for a time upon Hanumán, as Rávan did upon Sítá : and even Vishnu, at the churning of the ocean, was at first deceived by Ráhu, who appeared like one of the gods.

that the whole universe, whether animate or inanimate, is pervaded by the spirit of Ráma, I reverence with clasped hands the lotus feet of all, gods, giants, men, serpents, birds, ghosts, departed ancestors, Gandharvas, Kinnaras, demons of the night ; I pray ye all be gracious to me.

Chaupái.

By four modes of birth* are produced 84 lakhs of species inhabiting the air, the water and the earth. With clasped hands I perform an act of adoration, recognizing the whole world as pervaded by the spirit of Sitá and Ráma. In your compassion regard me as your servant, and dissembling no longer be kind and affectionate. I have no confidence in the strength of my own wisdom, and therefore I supplicate you all. I would narrate the great deeds of Raghupati ; but my ability is little and his acts unfathomable. I am not conscious of any special qualification or capacity ; my intellect in short is beggarly while my ambition is imperial ; and I am thirsting for nectar, when not even skim milk is to be had. Good people all, pardon my presumption and listen to my childish babbling, as a father and mother delight to hear the lisping prattle of their little one. Perverse and malignant fools may laugh, who pick out faults in others wherewith to adorn themselves. Every one is pleased with his own rhymes, whether they be pungent, or insipid ; but those who praise another's voice are good men, of whom there are few in the world ; there are many enough like the rivers, which on getting a rain-fall swell out a flood of their own, but barely one like the generous ocean, which swells on beholding the fulness of the moon.

Dohá 12.

My lot is low, my purpose high ; but I am confident of one thing, that the good will be gratified to hear me, though fools may laugh.

Chaupái.

The laughter of fools will be grateful to me : the crow calls the *koi*'s voice harsh. The goose ridicules the swan, and the frog the *chátak* ; so the low and vile abuse pure verse. As they have no taste for poetry nor love for Ráma, I am glad that they should laugh. If my homely speech and poor wit are fit subjects for laughter, let them laugh ; it is no fault of mine. If they have no understanding of true devotion to the Lord, the tale will seem insipid enough : but to the true and orthodox worshippers of Hari and Pará the story of Raghubar will be sweet as honey. The singer's devotion

* The four *ákaras*, or modes of birth are named *Pindaja* or viviparous ; *andaja* or oviparous ; *svedaja*, born in sweat like lice ; and *udbhijja*, produced by sprouting, like a tree. The 84 lakhs of species are divided as follows : 9 lakhs of aquatic creatures, 27 lakhs of those attached to the earth, 11 lakhs of insects, 10 lakhs of birds, 23 lakhs of quadrupeds, and 4 lakhs of men. The literal meaning of *ákara* being a mine, *kháni* which has the same primary signification, is used for it in *Chaupái* 44.

10 F. S. Growse—*The Prologue to the Rámáyana of Tulsi Dás.* [No. 1,

to Ráma will by itself be sufficient embellishment to make the good hear and praise his melody. Though no poet, nor clever, nor accomplished; though unskilled in every art and science; though all the elegant devices of letters and rhetoric, and the countless variations of metre, and the infinite divisions of sentiment and style, and all the defects and excellencies of verse and the gift to distinguish between them are unknown to me, I declare and record it on a fair white sheet—

Dohá 13.

That though my style has not a single charm of its own, it has a charm known throughout the world, which men of discernment will ponder as they read—

Chaupái.

The gracious name of Raghupati; all-purifying essence of the Purámas and the Veda, abode of all that is auspicious, destroyer of all that is inauspicious, ever murmured in prayer by Umá and the great Tripurári. The most elegant composition of the most talented poet gives no pleasure, if the name of Ráma is not in it; in the same way as a lovely woman adorned with the richest jewels is vile if unclothed. But the most worthless production of the feeblest versifier, if adorned with the name of Ráma, is heard and repeated with reverence by the wise, like bees gathering honey: though the poetry has not a single merit, the glory of Ráma is manifested in it. This is the confidence which has possessed my soul: is there anything which good company fails to exalt? Thus smoke forgets its natural pungency, and with incense yields a sweet scent. My language is that in vulgar use, but my subject is the highest, the story of Ráma, enrapturing the world.

*Chhand 1.**

Though rapturous lays befit his praise, who cleansed a world accurst,
Yet Tulsi's rivulet of song may slake a traveller's thirst.
How pure and blest on Siva's breast shew the vile stains of earth!
So my poor song flows bright and strong illumed by Ráma's worth.

Dohá 14. 15.

From its connection with the glory of Ráma, my verse will be most grateful to every one; when you apply sandal to your forehead, do you think of it as merely a production of wood? Though a cow be black, its milk is pure and wholesome and all men drink it; and so, though my speech

* A *Chhand* is generally a somewhat enthusiastic outburst, in which the oft-repeated rhyme is a little apt to run away with the sense. Whenever one occurs, I shall indicate its special character by giving it a metrical version. Its first line always repeats some word that occurred in the last line of the preceding stanza.



1876.] F. S. Growse—*The Prologue to the Rámáyana of Tulsi Dás.* 11

rough, it tells the glory of Sítá and Ráma, and will therefore be heard and repeated with pleasure by sensible people.

Chaupái.

A diamond in a serpent's head, a ruby on a mountain top, a pearl in an elephant's head are all without beauty ; but in a king's diadem or on a lovely woman they are lustrous in the extreme. Similarly, as wise men tell, poetry is born below, but inspired from above ; for it is in answer to pious prayer that the muse leaves her heavenly abode and speeds to earth ; without immersion in the fountain of Ráma's deeds, all labour and trouble count for nothing. A sensible poet understands this, and sings only of Hari, the redeemer, and his virtues. To recount the doings of common people is mere idle beating of the head, which the muse loaths. Genius is as it were a shell in the sea of the soul, waiting for the October rain of Inspiration ; if a gracious shower falls, each drop is a pearl of poetry :

Dohá 16.

Then dexterously pierced and strung together on the thread of Ráma's adventures, they form a beautiful chain to be worn on a good man's breast.

Chaupái.

Men born in this grim iron age are outwardly swans, but inwardly as black as crows ; walking in evil paths, abandoning the Veda, embodiments of falsehood, vessels of impurity, hypocrites, professing devotion to Ráma, but slaves of gold, of passion and of lust. Among them I give the first place to myself, a hypocrite alas ! of the very first rank ; but were I to tell all my vices, the list would so grow that it would have no end. I have therefore said but very little, but a word is enough for the wise. Let none of my hearers blame me for offering so many apologies ; whoever is troubled in mind by them is more stupid and dull of wit than I am myself. Though I am no poet and have no pretensions to cleverness, I sing as best I can the virtues of Ráma. How unfathomable his actions, how shallow my poor world-entangled intellect ! Before the strong wind that could uproot mount Meru, of what account is such a mere flock of cotton as I am ? When I think of Ráma's infinite majesty, I tremble as I write.

Dohá 17.

For Sarasvati, Sesh-nág, Siva and Brahma, the Shástras, the Veda, the Puránas, all are unceasingly singing his perfection, yet fail to declare it.

Chaupái.

All know the greatness of the Lord, yet none can refrain from repeating it. For this reason the Veda also has declared many different modes of effectual worship. There is one God, passionless, formless, uncreated, the

universal soul, the supreme spirit, the all-pervading, whose shadow is the world ; who has become incarnate and done many things, only for the love that he bears to his faithful people ; all-gracious and compassionate to the humble ; who in his mercy has refrained from anger even against the selfish and forward ; restorer of the past ; protector of the poor ; * all good, all-powerful, the Lord Raghuráj. In this belief the wise sing the glory of Hari ; and their song thus becomes holy and meritorious. I, too, bowing my head to Ráma's feet, am emboldened to sing his fame, following a path which has been made easy by the divine bards who have trodden it before me :

Dohá 18.

As when a king has prepared a bridge over a broad stream, an ant, insignificant as it is, is able to cross without difficulty.

Chaupái.

In this manner reassuring myself, I undertake to recount Ráma's charming adventures, as they have been reverently told by Vyása and the other great poets, whose lotus-feet I adore, praying, Fulfil ye my desire ; both the Sanskrit poets of these latter days who have sung of Raghupati, and also those of high intelligence who have written in Prákrit and the vulgar tongue. All who have been in time past, or who now are, or who hereafter shall be, I bow to all in the utmost good faith and sincerity. Be propitious and grant this boon that in assemblies of good men my song may be honoured ! If the good and wise will not honour it, the silly poet has had all his labour in vain. The only fame, or poetry, or power, that is of any worth, is that which like Ganges water is good for all. The incongruity between Ráma's glory and my rude speech makes me doubt ; but by your favour all will turn out well ; for good sewing can be shown on coarse cloth no less than on silk. Be kind enough to think of this, and my style will then match the excellence of my theme.

Dohá 19.

A clear style and an exalted theme are both commendable ; and when they are combined, an enemy even, forgetting his natural hostility, will repeat the strain. But such a combination is not to be acquired without genius, and genius I have none ; so again and again I beg of you to bear with me while I sing the glory of Hari. The great poets are like the swans sporting in the Mánasa lake of Hari's deeds ; look on me as a well-meaning child and make allowances.†

* *Gharīb-nawáz.* This is the first Persian word that has occurred in the poem.

† In Hindí poetry it is considered a beauty if a phrase is so worded as to be capable of two or more different interpretations. Thus the line rendered as above may be literally translated : Hearing my childish supplication, seeing my good desire, be compassionate towards me—which is the meaning I have expressed. But it might wit

Soratha 2.

I reverence the lotus-feet of the great sage who composed the Rámáyana, smooth strains on rough topics and faultless though a story of the faulty.* I reverence the four Vedas, which are like a boat in which to cross the ocean of existence, without ever dreaming of weariness, while recounting Ráma's excellent glory. I reverence the dust on the feet of Brahma, creator of this ocean-like world, from which have been produced men, good and bad; as of old from the same source came at once ambrosia, the moon, and the cow Kámadhenu, and also poison and intoxicating liquor.

Dohá 20.

Reverencing with clasped hands gods, Bráhmans, philosophers and sages, I pray: 'Be gracious to me and accomplish all my fair desire.'

Chaupái.

Again, I reverence the Sarasvati and the Ganges, both holy and beautiful streams, cleansing sin by a single draught or immersion, whose name as soon as uttered or heard at once removes error. I adore as I would my guru, or my natural parents, Siva and Párvati, protectors of the humble, daily benefactors, servants and courtiers in attendance on Sítá's Lord, and in every way Tulsi's true friends; who in their benevolence and considering the degeneracy of the times have themselves composed many spells in a barbarous language, incoherent syllables and unintelligible mutterings, mysterious revelations of the great Siva.† By his patronage I may make my story an agreeable one, and by meditating on Siva and Párvati may relate Ráma's adventures in a way that will give pleasure. It is only by his favour that my verse can be beautified, as a dark night by the moon and stars. Whoever in a devout spirit, with intelligence and attention, hears or repeats this lay of mine, he shall become full of true love for Ráma, and cleansed from worldly stains shall enjoy heavenly felicity.

equal correctness be rendered: Hearing my childish supplication, seeing their excellent beauty, be compassionate towards me. It is sufficient to note this peculiarity once for all; but there are an immense number of lines, in which, though the meaning which I have adopted seems to me on the whole the one most appropriate to the context, it by no means follows that other interpretations are not, from the grammarian's point of view, equally correct.

* A literal rendering would be—Rough, soft, beautiful, faultless, full of faults. But there are two plays upon words; for *sakhar*, ordinarily 'rough' and therefore contrasted with *sakomal* soft, is also intended to bear the meaning—'relating to the demon Khar'; and similarly *dúshan sahít* 'full of faults' can be forced into meaning 'with the demon Dúshan.

† The allusion is to the magic spells and mystical formularies of the 'Tantras, which are for the most part mere strings of uncouth and utterly unmeaning words. They all purport to have been revealed by Siva himself to Párvati.

Dohá 21.

Whether I am awake or dreaming, if Siva and Gauri grant me their favour, then my words shall come true and this shall be the effect of my song, though it be in the vulgar tongue.

Chaupái.

I reverence the holy city of Ayudhyá and the river Sarjú cleansing from all earthly impurity. I salute also the inhabitants of the city, for whom the Lord had no little affection; seeing that he ignored all the sin of Sítá's calumniator and set men's minds at rest.* I reverence Kausalya, eastern heaven from which glory was diffused over the whole world; whence Raghupati arose as a lovely moon, giving joy to the world, but blighting like a frost the lotus leaves of vice. To King Dasarath and all his queens, incarnations of virtue and felicity, I make obeisance in word, deed, and heart, saying Be gracious to me as to a son or a servant, O parents of Ráma, that acme of greatness, ye in whose creation the creator surpassed himself.

Soratha 3.

I reverence the king of Avadh, who had such true love for Ráma's feet, that when parted from his lord, his life snapped and parted too like a straw.

Chaupái.

I salute the king of Videha with all his court who had the greatest affection for Ráma; though he concealed his devotion under royal state, yet it broke out as soon as he saw him. Then next I throw myself at the feet of Bharat, whose constancy and devotion surpass description; whose soul like a bee thirsting for sweets was ever hovering round the lotus-feet of Ráma. I reverence too the lotus-feet of Lachhman, cool, comely and source of delight to their worshippers; whose glory is as it were the standard for the display of Ráma's pure emblazonment. Thou who, to remove the terrors of the world, didst become incarnate in the form of the thousand-headed serpent for the sake of the universe, be ever propitious to me, O son of Sumitra, ocean of compassion, store-house of perfection. I bow also to Ripusúdan (*i. e.* Satrughna) the generous hero, Bharat's constant companion; and to the conqueror Hanumán, whose glory has been told by Ráma himself—

* The calumniator was a dhobi, whose wife had gone away without asking his permission to her father's house and had stayed there three days. On her return her husband refused to take her in, saying, Do you think I am a Ráma who takes back his Sítá after she has been living for eleven months in another man's house? When this came to Ráma's ears, he showed his respect for the delicacy of his subjects by dismissing Sítá, and instead of punishing the dhobi promoted him to honour.

*Soratha 4.*

The son of the Wind, of profound intelligence, like a consuming fire in the forest of vice, in whose heart Ráma, equipped with bow and arrows, has established his home.

Chaupái.

The monkey-lord, the king of bears and demons, Angad and all the monkey host, I throw myself at the benign feet of them all, for though contemptible in appearance they yet found Ráma. I worship all his faithful servants—whether birds, beasts, gods, men, or demons—all his unselfish adherents. I worship Sukadeva, Sanat-Kumára, Nárad, and the other sages of excellent renown, putting my head to the ground and crying, ‘My lords, be gracious to your servant.’ I propitiate the lotus-feet of Janak’s daughter, Jánaki, mother of the world, best beloved of the fountain of mercy, by whose grace I may attain to unclouded intelligence. Again in heart, in word and deed, I worship the all-worthy feet of Raghunáth, the glance of whose lotus eyes like an arrow from the bow rejoices his votaries by destroying all their misfortunes.

Dohá 22.

As a word and its meaning are inseparable, and as a wave cannot be distinguished from the water of which it is composed, the difference being only in the name; so with Ráma and Sítá, the refuge of the distressed, whom I adore.

Chaupái.

I adore the name of Ráma as borne by Raghubar,* the source of all light, whether of the fire, or the sun, or the moon; substance of the triune god; vital breath of the Veda; the passionless; the incomparable; the source of all good; the great spell muttered by Mahádev and enjoined by him as necessary to salvation even at Kási. By confessing its power, Ganes obtained the first place among the gods;† by its power, though he muttered it backwards, the great poet Válmíki attained to purity; by its repetition, after she had heard from Siva that it was equal to a thousand names,

* For there are two other Rámas, besides Ráma-chandra; viz. Parasu-ráma and Bala-ráma.

† According to the legend: the gods were disputing among themselves as to which of them should be accounted the first. To settle the matter, Brahma proposed that they should all should race round the world. They started accordingly, each on the animal which he most delighted to ride; and Ganes being mounted, as was his custom, on nothing better than a rat, was of course soon left far behind. In his distress the sage Nárad appeared to him and suggested that he should write the word Ráma in the dust and pace round that, for in it was virtually included all creation. This he did and returned to Brahma who at once awarded him the prize.

Bhawáni was able to join her husband ;* while he, Mahádev, in his delight on beholding her simple faith, assumed the woman, making that ornament of her sex the ornament of his own body. Again, it was by the power of this name that the poison swallowed by Mahádev was converted into ambrosia.

Dohá 23.

Devotion to Ráma, says Tulsi Dás, is like the rich season of the rains ; but the two syllables of Ráma's name are best of all, like the months of Sáwan and Bhádon—

Chaupái.

Two sweet and gracious syllables, the eyes as it were of the soul, easy to remember, satisfying every wish, a gain in this world, and felicity in the next ; most delightful to utter, to hear, or to remember ; as dear to Tulsi as the inseparable Ráma and Lachhman. My love is inflamed as I speak of these mystic syllables, as intimately connected as the universal soul and the soul of man ; twin brothers like Nara and Náráyan, preservers of the world, redeemers of the elect ; bright jewels in the ears of beauteous Faith ; pure and beneficent as the sun and the moon ; like sweetness and contentment, the inseparable attributes of ambrosia ; like the tortoise and serpent, supporters of the world ; like the bee and the lotus of a pious soul ; and as sweet to the tongue as Hari and Balaráma were sweet to Jasodá.

Dohá 24.

Like a royal umbrella or jewelled diadem over all the other letters of the alphabet shine the two consonants in Ráma's name.

Chaupái.

A name may be regarded as equivalent to what is named, the connection being such as subsists between a master and servant. Both name and form are shadows of the Lord, who rightly understood is unspeakable and uncreated. They are sometimes wrongly distinguished as greater and less ; but the wise will understand my explanation of the difference between them. See now, the form is of less importance than the name ; for without the name you cannot come to a knowledge of the form ; if the very form be in your hand, still without knowing the name, it is not recognized ; but meditate on the name without seeing the form, and your soul is filled with devotion.

* One day when Siva had finished eating, he called to his wife Párvati to come and take her food too before it got cold. She pleaded that she had not yet finished repeating, according to her daily wont, the thousand names of Vishnu ; whereupon her husband instructed her that it would suffice if she said the mere name of ' Ráma ' once, for that had as much virtue as all the thousand. She at once believed him and complied ; and the god was so pleased at her ready faith that in her honour he assumed the Ardha-nári, or half-male, half-female form.



1876.] F. S. Growse—*The Prologue to the Rámáyana of Tulsi Dás.* 17

The mystery of name and form is unspeakable and cannot be told, but delightful to those who have intuition of it ; the name acting as a witness between the material and immaterial forms of the deity, and being a guide and interpreter to both.

Dohá 25.

Place the name of Ráma as a jewelled lamp at the door of your lips and there will be light, as you will, both inside and out.

Chaupái.

As his tongue repeats this name, the ascetic wakes to life, his thoughts free from passion and all detached from the world ; he enjoys the incomparable felicity of God, who is unspeakable, unblemished, without either name or form. Those who would understand mysteries, by repeating this name understand them ; the religious, who repeat this name absorbed in contemplation, become workers of miracles,* and acquire the power of rendering themselves invisible and the like ; those who repeat it when burdened with affliction are freed from their troubles and become happy. Thus there are in the world four kinds of Ráma-worshippers, all four good, holy and beneficent ; but of these four sages who trust in the name they are the most dear to the Lord who understand his mysteries. His name is great in the four Vedas and in the four ages of the world, but in this fourth age especially there is no other hope.

Dohá 26.

All free from sensual passions and absorbed in devout affection to Ráma, the soul disports itself like a fish in the ambrosial lake of his beloved name.

Chaupái.

The Supreme may be regarded both as devoid of all qualities and also as the quality of goodness ; in either aspect it is unspeakable, unfathomable, without beginning and without parallel. To my mind the name is greater than both forms, for by its own might it has brought both under its sway. My friends must not take this as an exaggeration on my part, for I say it confidently and with sincere devotion. The knowledge of the supreme is of two kinds, like fire which is either internal or visible ; each is in itself incomprehensible but is comprehended by means of the name ; and there-

* The miraculous powers that can be acquired by perfect saints, or siddhás, are reckoned as eight in number, and are called *animá, mahimá, garimá, laghimá, prápti, prákámya, isitvá, and vasittvá*. These words denote the faculty : 1st, of becoming infinitely small ; 2nd, of becoming infinitely great ; 3rd, of becoming infinitely heavy ; 4th, of becoming infinitely light ; 5th, of obtaining whatever one wishes ; 6th, of doing whatever one wishes ; 7th, of absolute supremacy ; 8th, of absolute subjugation.

fore I say that the name is greater than either Brahm or Ráma. For the one immortal, true, sentient, complete and blissful Brahm is all-pervading ; yet though such an unchangeable Lord is in our very soul, the whole creation is in slavery and wretchedness, till he is revealed in definite shape and is energized by the name ; as a jewel is not valued, till it is so called.

Doha 27.

Thus the virtue of the name is infinite and transcends the supreme ; and in my judgment is greater than Ráma himself.

Chaupái.

From the love that he bore to his followers, Ráma took the form of a man and by himself enduring misery secured their happiness. By incessantly and devoutly repeating his name, all the faithful may attain to felicity. Ráma himself redeemed only one woman, the ascetic's wife ;* but his name has corrected the errors of millions of sinners. To gratify the Rishi Viswamitra, Ráma wrought the destruction of Suketu's daughter Tádaká with her son Marícha and his army ; but as the sun puts an end to night, so his name has scattered all crime and pain and despair. In his own person Ráma broke the bow of Siva, but his glorious name has broken the fear of death ;† the Lord himself restored to life only the forest of Dandaka,‡ but his name has sanctified countless generations ; the son of Raghu destroyed many demons, but his name has destroyed all the evil of the world.

Doha 28.

Raghunáth conferred immortality on all his own faithful servants even down to the vulture Jatáyu ;§ but his name, precious theme of the Vedas, has delivered innumerable wretches.

Chaupái.

Ráma, as all men know, extended his protection to Sugríva and Vibhíshana ; but his name has protected countless supplicants, shining forth

* Ahalya, the wife of the Rishi Gautama, having been seduced by the god Indra, was cursed by her indignant lord and doomed to remain alone and invisible in the forest for thousands of years till Ráma should come and redeem her.

† Here is a play upon words which cannot be preserved in the translation ; for in the first half of the couplet the word *bhava* is to be taken as a name of Siva, while in the second half it means life ; or rather death ; since according to Hindu ideas all conscious life is merely a preparation for inevitable death.

‡ Dandaka is the name of the pathless forest near the Godavari, where Sítá was stolen away by Rávan.

§ The bird Jatáyu stopped the chariot in which Sítá was being carried off by Rávan and was mortally wounded by the giant, but he lived long enough to give Ráma tidings of his beloved. In return for his faithful services Ráma and Lakshman themselves performed his funeral rites.

gloriously in the world and the Veda. Ráma assembled a host of bears and monkeys and had no little trouble to build his bridge ; his name can dry up the ocean of life ; meditate thereon, O ye faithful. Ráma killed in battle Rávan and all his family and returned with Sítá* to his own city, a king to Avadh his capital, while gods and saints hymned his praises ; but his servants, if only they affectionately meditate on his name, vanquish with ease the whole army of error, and move, absorbed in interior ecstasy, without even a dream of sorrow.

Dohá 29.

The Name is greater than either Brahm or Ráma, and is the best gift of the best giver ; this Mahádev knew when he selected it from the hundred *crores*† of verses in the Rámáyana.

Chaupái.

By the power of this name the blessed god of curst attire, even the great Siva, acquired immortality ; by the power of this name Sukadeva, Sanat-kumára, and all saints, sages and ascetics have enjoyed heavenly raptures ; Nárad too acknowledged its power, himself as dear to Hara and Hari as Hari is dear to the world ; by repeating this name Prahlád through the Lord's grace became the crown of the faithful.‡ Dhruva in his distress repeated the name of Hari, and was rewarded by a fixed and incomparable station in the heavens ;§ by meditating on this holy name Hanumán won and kept the affection of Ráma ; by the power of Hari's name Ajámil|| and

* Sugriva, the monkey chief, assisted Ráma in his search for Sítá by shewing him the ornaments she had purposely dropped on the way ; and Ráma rewarded him by installing him as sovereign of Kishkindyá in the place of his brother Báli. Similarly, Vibhishana was made king of Lanká in the room of Rávan.

† Of these hundred crores it is said that Siva distributed 33 crores to each of the three worlds. The one crore that remained over he similarly divided into three sets of 33 lákhs each ; the odd láksh into three sets of 30 thousand each ; the odd thousand again into three sets of three hundred each ; the odd hundred into three sets of thirty-three each and finally the one remaining *shloka* into three sets of ten letters each. The two letters that remained over, being the two consonants in the name of Ráma, he kept for himself as containing the gist of the whole matter.

‡ Prahlád, the pious son of the impious Hiranya-Kasipu who was destroyed by Vishnu in the Narsinh avatar, was made equal to Indra for life and finally united with Vishnu.

§ Dhruva, the son of Uttánápáda, being slighted by his step-mother, left his home with the determination of winning himself a name in the world. By the advice of the seven Rishis, he devoted himself to the service of Vishnu, and was finally exalted by the god to the heavens, where he shines as the pole-star.

|| According to the history given in the 6th Skandha of the *Srí Bhágavat*, Ajámil was a Bráhmañ of Kanauj, of most dissolute and abandoned life. By a happy chance the youngest of the ten sons whom he had by a prostitute was named Náráyan ; and the father when at the point of death happened to summon him to his side. But the

the elephant and the harlot all three obtained salvation : why farther extend the list ? not even the incarnate Ráma could exhaust it.

Dohá 30.

The name of Ráma is as the tree of Paradise, the centre of all that is good in the world ; and whoever meditates upon it, becomes (says Tulsi Dás) transformed as it were from a vile hemp stick into a sweet smelling Tulsi plant.

Chaupái.

In all four ages of the world ; in all time, past, present, or future ; in the three spheres of earth, heaven and hell ; any creature that repeats this name becomes blessed. This is the verdict of the Veda, the Puránas and all the saints—that the love of Ráma is the fruit of all virtue. In the first age, contemplation ; in the second age, sacrifice ; in the Dvápar age, temple worship was the appointed propitiation ; but in this vile and impure iron age, where the soul of man floats like a fish in an ocean of sin, in these fearful times, the Name is the only tree of life, and by meditating on it all commotion is stilled. In these evil days neither good deeds, nor piety, nor spiritual wisdom is of any avail, but only the name of Ráma : his name is as it were the wisdom and the might of Hanumán to expose and destroy the Kálanemi-like* wiles of the wicked world.

god Náráyan, thus casually invoked, himself came in answer to the call, and rescued the guilty soul from the demons that were about to carry it off to hell.

The story of the elephant is given in the 8th Skandha of the same Purána. Ananta alligator had seized him by the foot while bathing, and though he struggled desperately for 2000 years, he was unable to rid himself of his enemy, and at last was deserted by all his wives and children. He then began to give himself up for lost ; but reflecting on the pertinacity of the alligator he came to the conclusion that the creature must be the embodiment of all the sins he had committed in previous existences and that god alone could save him. He therefore addressed a fervent prayer to Náráyan, who thus invoked by name came down from heaven and with his discus Sudarsan cut off the alligator's head and delivered the suppliant.

The 8th Chapter of the 11th Skandha gives the story of the penitent prostitute Pingalá.

* Kálanemi was the uncle of Rávan, who promised him half his kingdom if he would kill Hanumán. Accordingly he assumed the garb of a devotee and retired to a solitary hermitage on a mountain-top, where in course of time he was visited by Hanumán. The latter accepted the hospitality of the holy man, as he took him to be, before eating went to a pond close by to bathe. Here as soon as he put his foot in the water, it was seized by a crocodile, which, however, he soon killed, and out of its dead body sprung a beautiful nymph, who had long been under a curse. She bade him beware of Kálanemi, who was sitting deep in thought and already enjoying in anticipation the kingdom which he made sure he had secured. His dream was rudely broken by Hanumán who seized him in his strong arm, and hurled him headlong through the air, till he fell at Rávan's feet in Lanká.

Dohá 31.

As Narsinh was manifested to destroy the enemy of heaven Haranyakasipu, and protect Prahlád, so is Ráma's name for the destruction of the world and the protection of the pious.

Chaupái.

By repeating this name, whether in joy or in sadness, in action or in repose, bliss is diffused all around. Meditating upon it and bowing my head to Raghunáth, I compose these lays in his honour ; he will correct all my defects, whose mercy is mercy inexhaustible. Thou art my good Lord, I thy poor servant ; bear this in mind and graciously protect me. By the experience of the world and the revelation of the Veda, Ráma is known as a kind master, hearing prayer and acknowledging affection. Rich or poor, villager or citizen, learned or unlearned, pure or impure, good poet or bad poet, all according to their ability extol him as their king ; and he, good, amiable and gracious, lord of incomparable compassion, hears and accepts their honest attempts, recognizing in their words both devotion and a measure of ability. This is the way with earthly kings, and Ráma is their crown ; he is satisfied with simple piety though in one who is duller and feebler of intellect even than I am.

Dohá 32-33.

The merciful Ráma will regard the love and zeal of his poor servant, he who made a ship out of a rock and wise ministers out of monkeys and bears ; although I am a bye-word, and every one says Ráma is exposed to ridicule in that he, being such a lord, has such a servant as Tulsi Dás.

Chaupái.

My presumption is indeed very sad, as villanous and disgusting as hell ; but seeing me alarmed with these terrors of my own, Ráma would not dream of regarding them ; but hearing and with his own eyes perceiving my good faith, the Lord applauded my devout intention. Though my story is spoilt by the telling, Ráma is satisfied and accounts it good, since the will is good. The Lord is not mindful of a chance fault, but on every occasion he considers the heart. Thus the very crime, for which he, like a huntsman killed Báli, was in turn the sin of Sugríva and again of Vibhíshan ; but in their case Ráma did not dream of censure, but honoured them both at the meeting with Bharat and commended them in open court.

Dohá 34-36.

The lord under the tree and the monkey on the bough he accounted all equal to himself : says Tulsi, there is no master so generous as Ráma. O Ráma, thy goodness is good to all, and if so, then good to Tulsi also. Thus

P20711

declaring my merits and defects and again bowing my head to all, I proceed to tell the glorious acts of Raghubar, by the sound of which all the sin of the world is effaced.

Chaupái.

Now listen all in friendly wise while I relate the story as I have heard it, as it was communicated by Yájnavalkya to the great sage Bharadvāja. It was first of all composed by Siva and graciously revealed to Umá and again declared to Káka-bhusundi, known to be chief among the votaries of Ráma. From him Yájnavalkya received it, and he recited it to Bharadvāja. These listeners and reciters were of equal virtue and had an equal insight into Hari's sportive actions. Their intellect comprehended all time, as it were a plum in the palm of the hand; other intelligent votaries of Hari have also in different ways heard, understood and spoken.

Dohá 37-38.

I again heard the story from my own master at Súkarkhet, (*i. e.* Soron)* without understanding it, when I was quite a child and had no sense. And how could such a dull creature, being both ignorant and eaten up with worldly impurities, understand so mysterious a legend and a dialogue between such sage interlocutors.

Chaupái.

But my master repeated it time after time, till at length I understood as much as could be expected; and I now put it down in the vulgar tongue, as well as my understanding allows me; with my heart fixed on Hari's messenger (*i. e.* Hanumán), I speak with all the little sense, judgment and ability that I possess. The story that I have to tell clears my own doubts as it does every other error and delusion, and is a raft on which to cross the ocean of existence. The story of Ráma is a resting-place for the intellect; a universal delight; a destroyer of worldly impurity; an antidote to the venom of passion; a match to enkindle the fire of wisdom; the cow of plenty of this iron age; flowers of ambrosia to make good men immortal; a stream of nectar on the face of the earth; destroyer of death; a snake to devour toad-like error; befriending the good by the destruction of hell, in the same way as Párvati befriended the gods by destroying the army of demons; like Lakshmi rising from the sea in the assembly of the saints; immovable as the earth that supports all the weight of creation; like the Jamuná, to put to shame the angel of death; like Kási the saviour of all living creatures; as dear to Ráma as the pure Tulsi; as dear to Tulsi

* Soron, the modern name, is a corruption of Súkara-gráma (Boar-town). The place is still much frequented by pilgrims; the principal concourse being on the festival of the Varáha (or Boar) avatár. Súkara-gráma = Súar-gánw = Súaránw = Soron.

Dás as his own heart's desire ; as dear to Siva as the daughter of Mount Mekal (*i. e.* the Narmada) bestower of all perfection and prosperity ; like Aditi gracious mother of all the gods ; the perfect outcome of love and devotion to Raghubar.

Dohá 39.

The story of Ráma is as the river Mandákiní and a good intention like Mount Chitrakút, while sincere affection is as it were the forest where Ráma and Sítá love to abide.

Chaupái.

The legend of Ráma is like the delectable wishing-stone ; or as fair jewels to adorn Wisdom, the saint's bride ; His perfection is the joy of the world, conferring a state of virtue, wealth and eternal salvation ;* is a saintly instructor in wisdom, asceticism, and spiritual contemplation ; like the physician of the gods to heal the fearful diseases of life ; the very parent of devotion to Sítá and Ráma ; the seed of all holy vows and practices ; the destroyer of sin, of pain and of sorrow ; our guardian in this world and the next ; the Prime Minister and the General of Kingly Counsel ; a very Agastya† to drink up the illimitable ocean of desire ; a young lion in the forest of life to attack the wild elephants of lust, anger and sensual impurity ; as dear to Siva as the presence of a highly-honoured guest ; as an abundant shower to quench the fire of meanness ; a potent spell against the venom of the world ; effacing from the forehead the deep brand of evil destiny ; dispelling the darkness of error like the rays of the sun ; like a shower on a rice-field refreshing the aridity of prayer ; like the tree of Paradise, granting every desire ; like Hari and Hara accessible and gracious to all servants ; like the stars in the clear autumn sky of the poet's mind ; like the richness of life enjoyed by Ráma's votaries ; like the perfect felicity that is the reward of virtue ; like the assembly of the faithful in benevolence and composure ; like a swan in the pure lake of the believer's soul ; like the abundant flood of Ganga's purifying stream.

* The reading of all the copies I have seen is *Dáni mukti dhan dharm dhám ke* ; and this accordingly I have translated. But *dhám* might, with advantage, be corrected to *kám*, in which case the enumeration would be the ordinary four-fold one of the ends of human existence viz. *dharm, kám, artha, moksha*, 'religion, pleasure, wealth and final salvation.' It is, however, possible that Tulsi may purposely have suppressed *kám*, pleasure, as unworthy to be accounted a *telos* ; though in many other passages he includes it. *Dhám* may also be translated the Supreme Being, in which sense it gives a name to the sect of the Dhámis, or disciples of Prán Náth.

† As Agastya was one day worshipping by the sea-side, a wave came and washed away some of his altar furniture ; whereupon in three draughts he drank the whole ocean dry.

Dohá 40-41.

Ráma's perfect merit is like a strong fire to consume the dry wood of schism and heresy, evil practices and worldly deceit, hypocrisy and infidelity. His acts are like the rays of the full moon that give pleasure to all, but are specially consoling to the souls of the pious like the lotus and the *chakor*.

Chaupái.

All the questions that Bhawáni asked, with Sankara's replies thereto, I now proceed to give in substance, with agreeable diversity of style. No one is to be astonished if he should happen not to have heard any particular legend before; for a wise man on hearing for the first time any marvellous act will feel no surprise, reasoning thus with himself: I know well that there is no limit in the world to the stories about Ráma, for he has in various forms become incarnate, and the verses of the Rámáyana are some thousand millions in number; his glorious acts are of myriad diversity and have been sung by sages in countless ways. So indulge no doubts, but listen reverently and devoutly.

Dohá 42.

Ráma is infinite, his perfections infinite, and his legends of immeasurable extent; men of enlightened understanding will therefore wonder at nothing they hear.

Chaupái.

Having in this manner put away all doubt, I place on my head the dust from the lotus-feet of my master, and with folded hands making a general obeisance, that no fault may attach to my telling of the story, and bowing my head reverently before Siva, I proceed to sing of Ráma's excellent glory. In this *Sambat* year of 1631, I write with my head at Hari's feet, on Tuesday the 9th of the sweet month of Chait at the city of Avadh; on the day when the Scriptures say Ráma was born; when the spirits of all holy places there assemble, demons, serpents, birds, men, saints and gods, and there offer homage to Raghunáth, while the enlightened keep the great birth-day festival and hymn Ráma's high glory.

Dohá 43.

Pious crowds bathe in the all-purifying stream of the Sarjú, and murmur Ráma's name, while his dark and beautiful form is imprinted on their heart.

Chaupái.

The Vedas and Puránas declare that sin is cleansed by the mere sight or touch of this holy stream as well as by bathing in or drinking of it. It

immeasurable grandeur is indescribable even by the pure intelligence of Sarasvati. The city, exalting to Ráma's heaven,* beautiful, celebrated through all worlds, is so all-purifying that countless as are the number of animate species that result from the four modes of birth, yet every individual that is freed from the body at Avadh is free for ever. Knowing it to be in every way charming, a bestower of success and a mine of auspiciousness, I there made a beginning of my sacred song, which will destroy in those who hear it the mad phrenzy of lust: its mere name—lake of Ráma's acts—serves to refresh the ear, while the soul, like an elephant escaping from a forest on fire with lust, plunges into it and gains relief; delight of the sages, as composed by Sambhu, holy and beautiful; consuming the three ill conditions of sin, sorrow and want; putting an end to the evil practices and impurities of the wicked world; first made by Mahádeva and buried in the deep lake of his own soul till at an auspicious moment he declared it to Umá; thus Siva looking into his own soul and rejoicing gave it the excellent name of Rám-charit-mánas.† And this is the blessed legend that I repeat; hear it, good people, reverently and attentively.

Dohá 44.

Now meditating upon Umá and him who has a bull emblazoned on his standard (*i. e.* Mahádeva) I explain the connection, shewing how it is a lake and in what manner it is formed and for what reason it has spread through the world.‡

Chaupái.

By the blessing of Sambhu a bright idea has come into the poet Tulsi's mind regarding the Rám-charit-mánas, which I will state as well as I can, subject to the correction of those good people whose attention I invite. The heart is as it were a deep place in a land of good thoughts, the Vedas and Puránas are the sea, and saints are as clouds, which rain down praises of Ráma in sweet, grateful and auspicious showers; the sportive actions related of him are like the inherent purity and cleansing power of rain-water, while devotion, which is beyond the power of words to describe, is its sweetness and coolness. When such a shower falls on the rice-fields of vir-

* The compound may also mean,—giving a home to Ráma—and probably both meanings are intended.

† From this it will be seen that the name which Tulsi Dás himself gave to his poem was not 'the Rámáyana,' but the Rám-charit-mánas; a name which may be interpreted to mean either the lake or the soul of Ráma's acts. In the stanza above translated the word is first taken in the one sense, and then in the other; and as there is no English word with the same double signification, some obscurity is unavoidable.

‡ The words may also bear the following secondary meaning: I relate the whole history, shewing how the great soul became incarnate and why it dwelt in the world.

tue, it gives new life to the faithful, and as its holy drops fall to the earth they are collected in the channel supplied by the ears, and flowing into the lake of the soul fill it and then settle down permanently cool, beautiful and refreshing.

Dohá 45.

This pure and holy lake has four beautiful *gháts*, viz. the four charming dialogues contrived by divine wisdom :

Chaupái.

The seven Books are its beautiful flights of steps which the eyes of the soul delight to look upon ; the unqualified and unsullied greatness of Raghupati may be described as its clear and deep expanse. The glory of Ráma and Sítá as its ambrosial water ; the similes as its pretty wavelets ; the stanzas as its beautiful lotus-beds ; the elegance of expression as lovely mother-of-pearl ; the *chhands*, *sorathas* and couplets as many-coloured lotus flowers ; the incomparable sense, sentiment and language as the lotus-pollen, filaments and fragrance ; the exalted action as beautiful swarms of bees ; the sage moral reflections as swans ; the rhythm, involutions and all poetical artifices as diverse graceful kinds of fish ; the precepts regarding the four ends of life, the wise sayings, the thoughtful judgments, the nine styles of composition,* the prayers, penance, abstraction and asceticism, of which examples are given, are all the beautiful living creatures in the lake ; the eulogies on the faithful, the saints, and the holy name are like flocks of water-birds ; the religious audience are like circling mango groves and their faith like the Spring season ; the expositions of all the phases of devotion and of tenderness and generosity are like the trees and canopying creepers ; self-denial and holy vows are as flowers, and wisdom as the fruit ; the love for Hari's feet as the sound of the Vedas ; and all other stories and episodes as the parrots and cuckoos and many kinds of birds.

Dohá 46.

Pleasant is the sporting of the birds in grove, garden, or parterre, where good intention like a gardener bedews the eyes with the water of affection.

Chaupái.

Those who accurately recite these lays are like the diligent guardians of the lake ; the men and women who reverently hear them, these excellent

* The 9 poetical styles (or Indian Muses) are the *Sringár-ras*, or erotic ; the *Hásya-ras*, or comic ; the *Karuná-ras*, or elegiac ; the *Bír-ras*, or heroic ; the *Raudra-ras*, or tragic ; the *Bhayának-ras*, or melancholic ; the *Vibhatsa-ras*, or satiric ; *Shánt-ras*, or didactic ; and the *Adbhut-ras*, or sensational.

people are like its owners. Sensual wretches are like the cranes and crows that have no part in this pond nor ever come near it ; for here are no prurient and seductive stories like the snails, frogs, and scum on the water, and therefore the lustful crow and greedy crane, if they do come, are disappointed. There is much difficulty in getting to this lake, and it is only by the favour of Ráma that any one reaches it. For there are difficulties of evil society ; rocks of heresy ; wicked words like tigers, lions, and serpents ; the various intanglements of domestic affairs, like vast insurmountable mountains ; sensual desires like a dense forest full of wild delusions ; and unsound reasoning like a raging flood.

Dohá 47.

For those who have not the support of faith nor the company of the saints, nor fervent love for Raghunáth ; for them this lake is very hard of access.

Chaupái.

Again, if any one laboriously makes his way to it, but becomes overpowered by sleep and feverishness, a strange torpor and numbness settle on his soul, and though he is on the spot the luckless wretch makes no ablution. Having neither bathed in the lake nor drunk of it, he goes away in his pride, and when some one comes to enquire of him he abuses it. But those who by the blessing of Ráma gaze upon it, and deterred by no difficulties, reverently bathe, are relieved from the fierce flames of sin, sorrow and pain, and being sincerely devoted to Ráma will never abandon it. If, my friend, you would bathe in this lake, be diligent to keep company with the good. As for myself, having thus with the mind's eye contemplated it, my poetical faculty has become clear and profound, my heart swells with joy and rapture and overflows in a torrent of ecstatic devotion. My song pours on like a river flooded with Ráma's bright renown ; like the river Sarju, fountain of bliss, with religion and theology for its two fair banks ; a holy stream rejoicing the pious soul (*or* born of the Mánas lake) sweeping away all worldly impurities like the trees and roots on its bank.

Dohá 48.

The three kinds of hearers in the assembly are like the towns, villages and hamlets on the river side, while the saints are like the incomparable city of Avadh, full of all that is auspicious.

Chaupái.

The beautiful Sarju, as it were the glory of Ráma, has united with the Ganges of devotion, and the magnificent river Son, like the warlike power of Ráma and his brother, has joined them as a third. Between the two, the Ganges stream of devotion shines clear in its wisdom and self-control, while

the combined flood destroying the triple curse of humanity, is absorbed in the mighty ocean of very Ráma. The united stream of the Mánaś-born Sarju and the Ganges purifies the pious listener, while the various tales and episodes interspersed here and there are the groves and gardens on its opposite banks; the description of the marriage and wedding procession of Umá and Siva are like the innumerable fish in the water; the joy and gladness that attended Ráma's birth are like beautiful swarms of bees.

Dohá 49.

The childish sports of the four brothers are like the stores of goodly merchandise; the virtuous king and queen and their court like the bees and water-birds.

Chaupái.

The charming story of Sítá's marriage like the bright gleam of the flashing river; the many ingenious questions like the boats on the stream; the appropriate and judicious answers like the boatmen; again, the argumentative discussions show like crowding travellers; the wrath of Bhrigunáth like the rushing torrent; Ráma's soft speech like the well arranged gháts; the marriage festivities of Ráma and Lakshman like the grateful swell of the tide; the thrill of pleasure that spreads through the delighted audience like the ecstatic feelings of the virtuous bathers; the auspicious preparations for marking Rama's forehead with the *tilak* like the crowds assembled on holidays; and like the river mud is Kaikeyi's evil counsel, the cause of many calamities.

Dohá 50.

Like prayers and sacrifices effectual to remove every misfortune are Bharat's virtuous acts; while the corruptions of the world, and sinful men, and slanderers are like the scum on the water and the cranes and crows.

Chaupái.

This river of glory is beautiful in each of the six seasons, bright and holy exceedingly at all times. In winter there is the marriage of Siva with the daughter of the snowy mountains; in the dewy days the glad rejoicings at the Lord's birth; the account of the preparations for Ráma's wedding are for the delightful and auspicious spring; Ráma's intolerable banishment, the story of his rough journeyings and exposure to the sun and wind are the hot-weather; his encounters with fierce demons, by which he gladdens the hosts of heaven, are like the rains that refresh the fields; the prosperity of his reign, his meekness and greatness, are like the clear, bountiful and lovely autumn*; the recital of the virtues of Sítá, that jewel of

* The six Hindu seasons, to which allusion is here made, are Hemant, winter; Sisir, the early spring; Basant, the spring; Grishm, the hot weather; Varshá, rains; and Sarad, the autumn.

faithful wives, is as the undefiled and excellent water ; the amiability of Bharat as its unvarying coolness.

Dohá 51.

Their looks and words at meeting, their mutual love and laughter, the true fraternal affection of the four brothers are as the water's sweet odour.

* *Chaupái.*

My suppliant address and self-depreciation and modesty correspond to the singular lightness of good water, which is anything but a defect. This marvellous lymph works its effect by the mere hearing, quenching the thirst of desire and cleansing the soul of impurity ; it resuscitates true love to Ráma and puts an end to all the sin and sorrow of the world, draining life of its weariness, comforting with true comfort, destroying sin and pain and poverty and error, dispelling lust and passion and phrenzy and infatuation, and promoting pure intelligence and detachment from the world. Those who reverently drink or bathe in this stream, from their soul is effaced all sin and distress ; those who do not cleanse their heart in it are wretches whom the world has ruined, turning back, hapless creatures ! like a panting deer that has seen a river in a mirage.

Dohá 52-54.

Thus have I declared to the best of my ability the virtues of this excellent water, and having plunged my own soul in it, and ever remembering Bhawáni and Sankara I proceed with my delectable story. I will first repeat in substance the original conversation, with the questions put by Bharadwája when he found the Muni Yajnavalkya ; and laying my soul at the lotus feet of Raghupati and thus securing his patronage, I will sing the meeting of the two great saints and their auspicious discourse.

Thus ends the Prologue and from here the real action of the poem commences.



On Early Asiatic Fire Weapons.—By MAJOR-GENERAL
R. MACLAGAN, R. E.

The use of fire in some form or other in war, must have suggested itself to fighting people at a very early period in all countries, and has probably been practised in all ages, both for attack and for defence. To carry fire and sword into an enemy's territory is the common representation of active and desolating aggression. And from the simple and direct application of fire to the destruction of dwellings and other property, it was a natural step to devise ways of applying it from a distance by means of burning matter attached to missiles.

In our day the term *fire-arms* is applied to weapons which, by means of explosive matter, project heavy bodies to a distance, though no fire may be carried by the missile itself. Early fire weapons in all countries sent the fire with the missile, discharging it by the mechanical appliances in ordinary use for throwing missiles of other kinds.

When the use of igneous projectiles of any kind came to be commonly practised, endeavour was then made to devise means of projecting them with force that they might reach to a greater distance; and, at the same time, of making them as tenacious as possible of the fire they carried, and as violent as possible in their combustion. Success in the first of these objects would, with the more ordinary inflammable materials, defeat the second,* and a great advantage was gained by the use, for this purpose, of combustibles of some more powerful kind.

The earliest kinds of fire-missiles appear to have been much the same everywhere—arrows tipped with oiled flax, or wrapped with some soft matter soaked in oil, and discharged in the ordinary way from bows. Such was the simple contrivance which, nearly five centuries before our era, the Persians who had occupied Mars Hill, made use of to fire the palisades of the defenders of the Acropolis.† And such, probably with little variation, were the fire-arrows‡ that were used in all countries for some hundreds of years. After a time, the improvement was introduced of putting the fire in a small perforated case, or hollow enlargement of the shaft, a little behind the point, which was roughly barbed to make it hold hard in the object assailed and keep the fire applied so long as it lasted. This was the *malleolus*, as

* So with one of the early forms of fire-arrow,—*Et si emissæ lentius arcu invalido (ictu enim rapidiore exstinguitur) hæserit usquam, tenaciter cremat, &c.* Ammian. Marcell., XXIII, 4, 15 and XXIII, 6, 37.

† Herod., VIII. 52.

‡ Alluded to generally in Eph. vi. 16 as *βέλη πεπυρωμένα*, and more or less specifically by various authors as *πυρφόροι διστοί*, *πυρφόρα τοξεύματα*, *τὰ πυροβόλα*, &c.

it was made in the fourth century;* a missile which seems to have been familiar for a long time under that name,† and which was no doubt originally made hammer-headed in some sense, and afterwards had the fire case put into this more effective shape. It is of this improved missile that Ammianus says it had to be projected with only moderate force, as otherwise the fire was apt to go out in the course of its flight. The fire-bearing javelin (called *falarica*), which was thrown by hand or with greater force by a tormentum or twisted cord apparatus, either had the ignited matter wrapped round the point‡ or, like the malleolus, carried the fire in a metal case or cage.§ And from the war engines were also thrown vessels of combustibles by themselves.||

Each of these kinds of burning missiles acquired increased efficiency by the employment of materials giving a more effective and persistent flame; and petroleum or naphtha, when obtainable, or other bituminous products, came to be used in place of the vegetable oils.¶ In countries in which these mineral oils are found, in some form or other, the effective character of the fire used in this way in war may be generally ascribed to the use of materials of this class. Naphtha appears to have been the first and chief of the materials used for producing the Greek Fire,** which was the most distinctive and destructive of the war-missiles of the middle ages in the East. Other inflammable substances, combined with naphtha or petroleum in the Greek Fire compositions, came next to be used in similar manner without the oil. And these dry compounds, of various proportions, used at first only in this way, reached their highest power and application when, in the form of gunpowder, the explosive material was employed not merely for the purpose of

* Amm. Marcell., XXIII, 4, 14.

† —plena omnia malleolorum ad urbis incendia comparatorum (Cic., Pro Mil., XIV).

‡ As used by the defenders of Saguntum against Hannibal:—ad extremum unde Therurum exstabat. Id sicut in pilo quadratum stuppa circumligabant lineabantque pice. that tiv. XXI, 8.) And the flame, it is stated, instead of being extinguished, gained increased Bhatnir in its passage through the air.

§ Vegetius, De Re Militari, IV. XVIII.

|| *ἄγγεια πυρφόρα*. Polyb., XXI, 5, 1. Arrian, *Exp. Alex.* I, 21, 22, 23; II, 19. Diod. * P. XX. 4. Tac., *Hist.*, II, 21. Virg., *Æn.*, X, 130. 1. Maccab., VI, 51. Ockley, *of the Saracens*, 427).

¶ *Li* Bitumen, sulphur, picem liquidam, oleum quod incendiarium vocant ad exuren- *l.* *Hostium machinas, convenit praeeparare.* Vegetius, *De Re Militari*, IV, 8, and V, 14. *ἄγγεια δὲ θέλου καὶ ἀσφάλτου ἐμπλησόμενοι καὶ φαρμάκου ὅπερ Μηδοὶ μὲν νόθουσαν καλοῦσιν, Ἕλληνας δὲ Μηδείας ἔλαιον.* (Procopius, *de Bell. Goth.*, quoted in Lalanne's *Recherches sur le Feu Grégeois*, p. 48).

** "It would seem that the principal ingredient of the Greek Fire was naphtha or liquid bitumen." Gibbon, *Chap. LI.*

feeding the fire in the projectile, but as the agent for discharging it. This last is the great step from medieval to modern artillery.

The advance from one kind of fire-missile and fire material to others more effective has not, there is reason to believe, been made by immediate invention or discovery. Local conditions have originated, and practical experience has extended and modified, the use of various preparations and contrivances for this purpose. M. Reinaud, in the work* issued jointly by him and Colonel Favé in 1845, has brought together a number of extracts from Arabic works giving receipts for the preparation of war-fire of sorts, showing that the compositions which it has been the custom to call *Greek Fire* were various, and that many of them contained one or two or all of the ingredients of gunpowder, before the times to which the invention of gunpowder is ordinarily ascribed. From these early receipts for fire-works and fire-missiles, and from the various accounts of *Greek Fire* and its effects, it would appear that modifications of these compositions, introduced from time to time, led up to the preparation of gunpowder; which yet was not what we understand by *gun-powder* till it came to be prepared in a form adapting it for use as the propelling agent in guns, and to be so used.

From very simple and rude arrangements for using the aid of fire in fighting, gradual progress in various ways had been generally made before gunpowder times; yet simple and rude arrangements continued to be used, even after better devices were known, when these were not available, or when the others were sufficient and suitable for the occasion. Sufficiently primitive was the method adopted by Timur, of carrying fire into the ranks of an enemy, when, in his battle before Dihli in A. D. 1399, he caused a number of camels to be laden with dry grass and driven towards the opposing force with the grass set on fire, on sight of which the enemy's elephants fled.† This was a resort to a very rude contrivance at a time when means of projecting fire to a distance were well known, and when fire was employed

* *Historie de l'Artillerie*, 1re partie. Du Feu Grégeois, &c., pp. 26 et ss. Some notices of the early use, among the Arabs, of the ingredients of gunpowder, are given in a "History of the Art of War and Organisation of Armies in Europe" by Hermann Meynert; a book I have not seen and only know of from a newspaper notice.

† This is one of the incidents of the Indian expedition related to Clavijo who was residing at the court of Timur at Samarqand. (*Embassy of Ruy Gonzalez de Clavijo to the Court of Timour*, A. D. 1403-6, p. 153.) According to other accounts, they used buffaloes that he used, tied together in pairs with burning bushes between them (*Maurice's Modern History of Hindostan*, II, 20). Somewhat similar, but with a different purpose, was Hannibal's device when in camp before Q. Fabius Maximus, B. C. 200. Obducta nocte, sarmenta in cornibus juvencorum deligata incendit, ejusque generis multitudinem magnam dispalatam immisit. (*Corn. Nep., Hann. V.*)

of more effective kinds for creating the alarm that was desired. Such fire-missiles were familiar to Timur himself and his predecessors. At the siege of Otrár by Chingiz Khán, A. D. 1219, the defenders made good use of burning darts, to the injury of the besiegers' engines. The following year, in besieging the citadel of Bukhára after gaining the town, he threw in pots of burning naphtha. He used Greek Fire in his attack on Khívá, the same year, and it was used by and against him on other occasions.* Timur eight years before his invasion of India, had made use of Greek Fire discharged from his boats in his attack on a small town on the shores of the Caspian.† In India he encountered fire missiles of other kinds at his attack on Bhatnir, when "the besieged cast down in showers arrows and stones and fireworks upon the heads of the assailants."‡ Timur himself relates that Sultán Mahmúd, when he attacked him at Dihlí, had elephants covered with armour, most of them carrying howdas "in which were throwers of grenades (*ra'd-andíz*), fireworks (*átash-báz*), and rockets (*takhsh-andáz*)."[§] Timur, in his engagement with Báyzid I., before Angora, three years after the Dihlí battle, had a special body of men for throwing Greek Fire.|| What was the nature of the various fireworks used by Sultán Mahmúd at Dihlí, and by the defenders of Bhatnir, is not indicated. In the regions where Greek Fire was used by Chingiz and Timur, naphtha abounded or was readily obtainable, and it is, in some of the instances, named as the material used. There does not seem to be reason to believe that Timur was acquainted with gunpowder, as General Cunningham has supposed.¶ The use of Greek Fire, or of missiles answering to the descriptions of the fire generally so designated, was practised chiefly in countries where naphtha, petroleum, or bitumen, is produced, and more rarely elsewhere. It is stated that Edward I., when besieging Stirling Castle in 1304, after calling for large supplies of balistæ, quarrells, bows, and arrows, from York, Lincoln, and London, "gave orders for the employment of a new and dreadful instrument of destruction, the Greek Fire, with which he had probably become acquainted in the East."*** There is nothing to show what the composition was, but it is most probable that this, as well as the fireworks which Timur encountered at Dihlí and at Bhatnir, was composed of some of the *dry* materials used elsewhere combined with naphtha,—the ingredients of the future gunpowder.

* *Petis de la Croix, History of Genghiscan*, pp. 166, &c., and 190, &c., from Mirkhwánd and others.

† Life of Timour Beg, prefixed to Markham's translation of Clavijo.

‡ *Malfuzát i Tímúrf*, in Sir H. Elliot's *Historians of India*, by Prof. Dowson, III, 424.

§ The same, III, 439.

|| Langlès, *Vie de Timour*, p. 88, (quoting Sharafuddín).

¶ Essay on the Arian Order of Architecture, J. A. S. B., XVII, 1848, ii., 244.

*** For this statement Tytler refers to the *Liber Garderobæ*, or Wardrobe Book, of Edward I., p. 52 (*Hist. of Scotland*, I, 181).

From the account above referred to of the defence of Bhatnir, it would appear that the fire was not projected to a distance, but thrown down from above on the attacking party when they came near. The direct delivery of hot matter on the heads of assailants, and of fire upon their engines, when they approached close to the walls, is a means of offensive defence which must have occurred to most people, and for which special arrangements were often made in the construction of defensible places:—

Where upon tower and turret head
The seething pitch and molten lead
Reek'd like a witch's cauldron red.*

The kind of defence is one which was by no means superseded by the possession of means of projecting the fire or scalding matter to a distance; but it was an arrangement of more prominent importance, and which received very special care and attention, in times when there was both more hand-to-hand work in fighting, and closer operations in the attack and defence of fortified positions. Sir Richard Maitland's defence of his castle of Lander in 1296 is commemorated in the ballad which tells us how he cast down combustibles upon the roofed machine called the *sow* (a British version of *testudo* or *musculus*) when it was brought close up:—

They laid their sowies to the wall
Wi' mony a heavy peal,
But he threw ower to them agen
Baith pitch and tar barrel.†

a plan which was followed also, not without much art and skilfully prepared appliances, by the Flemish engineer, John Crab, in the defence of Berwick when besieged by Edward II. in 1319. Barbour relates how to "throw Crabys cunsail" they rigged up a *crain* "rynnand on quheills", that it might be readily brought to any part of the walls when required:

And pyk, and ter, als haiff thai tane,
And lynt, and herds,‡ and brymstane,
And dry treyis that wele wald brin.

of which they made "gret fagalds" to be lifted over by the machine and dropped, burning, on the assailants' engines, which were at the same time laid hold of with grappling hooks and chains to prevent their removal.

* *Lay of the Last Minstrel.*

Hi jaculis, illi certant defendere saxis,

Molirique ignem, nervoque aptare sagittas. (*Æn.* X, 130.)

† *Auld Maitland.* (Minstrelsy of the Scottish Border.)

It was an exact repetition of an old proceeding. "Cupas tædâ ac pice refertas incendunt, easque de muro in musculum devolvunt." (*Cæsar, de Bell. Civ.,* II. 11.) This is what the defenders of Marseilles did, B. C. 49.

‡ Refuse of flax.

And giff the sow come to the wall,
To lat it brynd on her fall,
And with stark chenyeis hald it thar,
Quhill all were brynt up that thar war.*

For exposure to any such direct and plentiful application of fire at close quarters some roof covering of a not very inflammable kind was needed. The *musculus* which came under the fire of the Massilian tar-barrels,† was prepared for it, sheltered by tiled roofing covered with earth and hides. Protection, also, against fire missiles discharged from a distance needed, in order to answer its purpose, to be adapted to the character of the burning matter which it had to resist; and shelter which was sufficient against the more innocent combustibles was not fitted to encounter burning naphtha or Greek Fire. Against the more primitive fire-arrows, leathern mantlets served for the protection of the soldiers and workmen, and for the defensive covering of the towers and engines. At the attack on Bamián by Chingiz Khán, A. D. 1221, an order was given to kill as many horses and cows as would provide hides to cover the besieging engines, by which it is said they were effectually protected. The fire thrown by the defenders did them no harm. But at Khojand, two years before, when the besieged threw burning naphtha, additional shelter was used, made of sheets of felt covered with clay, and moistened with vinegar.‡ By many writers vinegar is mentioned as the best or only means of quenching Greek Fire.§ Against the fire arrows and

* Barbour, *The Bruce*, Book XVII.

† Thucyd., II, 75. Arrian., *Exp. Alex.*, II, 18. When we are told of a stouter protection being insufficient against a phalarica,—

Sed magnum stridens contorta phalarica venit
Fulminis acta modo; quam nec duo taurea terga
Nec duplici squamâ lorica fidelis et auro
Sustinuit. (Virg. *Æn.* IX, 705.)

we may infer that this had nothing to do with the kind of fire with which the javelin was charged, but is meant to indicate, in poetical fashion, the force with which it was launched by the hand of a hero.

‡ Petis de la Croix, *Hist. of Genghiscan*, 307, 190. In the First Crusade an engine is said to have been made to Godfrey's order by

“a cunning architect,
William, of all the Genoas lord and guide.”
“whereof he clothed the sides
Against the balls of fire with raw bull's hides.”

Tasso, *Jer. Del.* (Fairfax's translation), XVIII, 41, 43.

But this protection was not effectual. It could not withstand the Greek Fire (XVIII, 84).

§ So in two Latin Chroniclers quoted by Lalanne in his *Recherches sur le Feu Grécois*, p. 30;—“Inextinguibilem ab omni re præter acetum” (*Ditmar*).—“Græcum ignem qui nullo præter aceti liquore exstinguitur.” (*Luitprand*.) A very old writer on military affairs, Æneas Poliorceticus, (about 360, B. C.) says (ch. 34) that the fire

fire *Páo* of the Tartars, the Chinese (A. D. 1273) constructed defensive covering for their horses of rice straw ropes covered with clay.*

It is when Greek Fire comes to be employed that the *noise* is specially noticed; which has given occasion to the surmise that it was in reality gunpowder. A French writer who has made researches on the subject (M. Lalanne), endeavours to show that it was nothing else than gunpowder, used as such, and that the tubes from which it was sometimes discharged, were cannon. But it may be observed that the noise mentioned in connection with Greek Fire was the noise accompanying the flight and combustion or explosion of the burning missile itself, as it came among the people against whom it was launched. Noises of a kind that would be alarming to those unused to this instrument of warfare, may accompany the combustion of naphtha or petroleum, which appears generally to have been the chief ingredient of this fire composition. And *any* noise would contribute to the terror occasioned by encountering a hostile fire so formidable on other accounts, and would be magnified by the apprehensions of those exposed to it. And their accounts of it constantly exhibit the perturbation it caused.

They come not,—while his fierce beleaguers pour
Engines of havoc in, unknown before
And horrible as new; javelins that fly
Enwreath'd with smoky flames through the dark sky,
And red hot globes that, opening as they mount,
Discharge, as from a kindled naphtha fount,
Showers of consuming fire o'er all below.†

The most graphic accounts of the Greek Fire, "horrible as new," and of the wonder and alarm which it created, are given in the pleasant pages

thrown by the enemy is to be put out with vinegar. He goes on to mention (ch. 35) a certain *πῦρ ἱερὸν*, which he says can by no means be extinguished; and Casaubon, in his comment, thinks from the terms used that though certain materials are named (pitch, sulphur, &c.), something more is possibly intended, of the nature of Greek Fire. (*Isaaci Casauboni in Æneam Notæ*, 587.)

* Reinaud and Favé, *Feu Grégeois*, p. 196. Yule's *Marco Polo*, 2nd Ed., II, 154.

† *Lalla Rookh*. *The Veiled Prophet*. Moore's note, along with other references, notices Gibbon's account of the Greek Fire—"It was either launched in red-hot balls of stone and iron, or darted in arrows or javelins twisted round with flax and tow which had deeply imbibed the inflammable oil." Fire missiles of the same general character, and formidable quite as much on account of their novelty to those against whom they were used as on account of their real power or destructiveness, were in use long before anything of the kind bore the name of Greek Fire. "The Rhodians had engines on board their ships, by means of which they threw fire upon those of the enemy. This probably resembled the substance which in later times was called Grecian fire: to judge of it from the manner in which the Greek historians speak of it, it was not thrown with rockets, and was certainly something inextinguishable and not generally known." (*Niebuhr's Lectures on the History of Rome*, by Schmidt, II, 184.)

of the Sire de Joinville's History of St. Louis. "La manière du feu grégois estoit tele que il venoit bien devant aussi gros comme un tonnel de verjus, et la queue du feu qui partoît de li, estoit bien aussi grant comme un grant glaive. Il faisoit tele noise au venir, que il sembloit que ce feust la foudre du ciel; il sembloit un dragon qui volast par l'air. Tant getoit grant clarté que l'on véoit parmi l'ost comme se il feust jour, pour la grant foison du feu qui getoit la grant clarté."* This was in Egypt, in 1249. It was discharged from the engines called *perriere* (pierrière) upon the crusaders' *chas-chastiaus*, or towers, and against their stockades. Again it is described as having been thrown by hand, in what we may suppose to have been something like grenades. "Au darrien il amenèrent un vilain à pié, qui leur geta troiz foiz feu grégois. L'une des foiz requeilli Guillaume de Boon le pot de feu grégois à sa roelle; car se il se feust pris à riens sur li, il eust esté ars."† And again attached to arrows, "— si grant foison de pylés à tout le feu grégois, que il sembloit que les estoiles du ciel chéissent."‡

Hallam, in noticing Joinville's account of the Greek Fire, calls it "an instrument of warfare almost as surprising and terrible as gunpowder."§ And in another place he refers to a frequently-quoted passage of an Arabic work,|| written just about the time of Joinville's first-mentioned experience of Greek Fire, and which mentions, Hallam says, the use of gunpowder in engines of war, "though they may seem to have been rather like our fireworks than artillery." Quoting from Casiri's Latin translation, "*serpunt susurrantque scorpiones circumligati ac pulvere nitrato incensi, unde explosi fulgurant ac incendunt*," he says "one would be glad to know whether *pulvis nitratus* is a fair translation." If Mr. Hallam had had the advantage of seeing the results of the researches of M.M. Reinaud and Favé, he would (although the translation is shown to be open to objection) have had no occasion to question the literal *pulvis nitratus*, without coming to the conclusion, as he does, that "there can on the whole be no doubt that gunpowder is meant."¶ The description which follows the passage quoted above is not very different from other accounts of Greek Fire, which indicate

* *L'Histoire de Saint Louis*, Ch. XLIII.

† *Ibidem*, Ch. XLIX.

‡ *Ibidem*, Ch. LXIII.

§ *Middle Ages*, I, i., p. 41 (ed. 1860).

|| In *Casiri, Bibl. Arab. Hispan.*, t. ii, p. 7. (Reference in Hallam.)

¶ *Middle Ages*, I, 479. M. Reinaud notices that the word *bârūd*, used in the original of the passage referred to, is applied both to nitre and to gunpowder. He gives the passage in the Arabic, and a corrected translation in French, and adds, "On voit que Casiri, qui traduisait *bârūd* par *pulvere nitrato*, et qui ne connaissait pas d'autre propriété de la poudre que l'explosion, en a introduit l'idée dans sa traduction. Voulant donner un sens à ce passage, il était naturellement amené à y voir l'emploi que nous faisons maintenant de la poudre." (*Reinaud and Favé, Feu Grég.*, 67.)

some material like petroleum, persistent in burning, and readily laying hold of, and setting fire to, objects with which it came in contact.

In a history of the early Muhammadan occupation of Egypt, called the *Maurid al-latâfat*, where mention is made of the use of naphtha for fiery missiles, in A. H. 532 (A. D. 1138), the English translator says in his note, "Utrum auctor noster per vocabulum Naphtham significare velit compositionem illam quam plurimi antiqui scriptores nomine *Ignis Græci* commemorârunt, an nostrum *Pulverem tormentorium*, nescio."* As the author says the missiles were fed with naphtha (نَافْثَة), there need be no doubt. As elsewhere, other materials may have been added, but there is nothing to indicate this. The translator, however, thinks the supposition that possibly gunpowder was used, is supported both by the passage from Casiri referred to by Hallam, and by another account of a still earlier date. "Et quidem apud Arabas vetustissimum pulveris nitrati usum esse liquet; refert Elmacinus, Lib. I. Hist. Sar., 'Eodem hocce anno (*scil.* A. H. 71, [A. D. 690]), Hajaz arctâ premens obsidione Meccam, manganis et mortariis, ope naphthæ et ignis in Cabam jactis, illius tecta diruit, combussit et in cineram redegit.' " The names applied to the engines might raise some question, but the naphtha is there. And in many other instances naphtha is distinctly mentioned, by oriental and other writers, as thus used in medieval fire missiles. To which, in the West, people have been accustomed to give the name of Greek Fire.†

But, on other grounds besides the mention of *pulvis nitratus* in some of the Greek Fire compositions, it has been inferred that gunpowder was known, as a source of power for propulsion as well as a pyrotechnic composition, and that cannon were used, in times long anterior to those of the really known and certain application of gunpowder to the purposes of modern artillery. In particular, the frequent use of *tubes* for the discharge of the

* *Maured Allatafet*, ed. J. D. Carlyle, A. M.

† Advenit etiam legatus Kaliphæ juvenis illustris, secum vehens naphthæ duo onera, multitudinemque naphthariorum artificum in ignibus jaculandis. (*Bahd ud-dîn*, transl. by Schultens, quoted by Lalanne, *Recherches sur le Feu Grégeois*, p. 41, note.) Tasso (La Gerus., Lib. XII, 17) makes the magician Ismeno prepare a composition for burning the war engines of the enemy, of which composition a note by one of his editors, Signor Pietro Fraticelli, says, "Dal miscuglio di qui parla Ismeno, dover risulturne il così detto fuoco greco, &c." "Questo fuoco," he goes on to say, quoting the Military Dictionary of Giuseppe Grassi, "è invenzione antichissima de' Persiani, i quali adoperavano il nafta come principale ingrediente di esso." And he adds "I Saraceni lo componevano in quel tempo col nafta o petrolio, che si raccoglie nelle vicinanze di Bagdad." And the poet, further on (XVIII, 47), when

Ismen prepara

Copia di fochi inusitata e rara,

says that the asphalt of the Dead Sea was used in the composition.

Greek Fire, and the fact of a *report* of some kind being often mentioned in connection with it, have helped to give occasion to this belief.

Gibbon, in his account of the siege of Constantinople, A. D. 717, after observing that the principal ingredient of Greek Fire seems to have been naphtha or liquid bitumen, says that, when employed at sea, it was "most commonly blown through long tubes of copper, which were planted on the prow of a galley, and fancifully shaped into the mouths of savage monsters, that seemed to vomit a stream of liquid and consuming fire."* A little earlier than the occasion to which Gibbon's account relates, a similar mode of discharging naphtha fire on land appears to have been practised by the Arab invaders of Sind (A. H. 93, A. D. 712). Their employment of naphtha in their battles with the Hindu inhabitants is noticed repeatedly in the *Chachnámah*, in passages of which extracts are given in Vol. I, of Prof. Dowson's edition of Sir H. Elliot's *Muhammadan Historians of India*.† When the enemy's elephants approached, Muhammad Kásim ordered his naphtha-throwers to attack them. Burnes, quoting from another part of the *Chachnámah*, not included in Sir H. Elliot's extracts, or from another version, says the Muhammadans, in the battle at Alor, when the elephants were brought against them, had to assail them with combustibles. They "filled their pipes, and returned with them to dart fire at the elephants." Burnes, in his foot-note, supposes pipes for smoking to be meant, and remarks that it must have been bhang or hemp which they smoked in those days, as tobacco was not known.‡ But apparently the word should have been *tubes*. They were probably like what were called in the West *χειροσίφωνα*, or hand-tubes, employed for the same purpose,§ in which either naphtha or special fire compositions might be used, and through which the fire was discharged, or *in* which it was thrown. One of the meanings given by Golius to the word *nafát* or *naffát* is "*instrumentum æneum quod exploditur naphthæ seu pulveris pyrii ope, scil. tormentum bellicum.*"|| He seems to intimate that a name originally connected with naphtha may have continued to be used to designate the weapon, even after gunpowder or other

* "We got into a boat like a fire ship," Ibn Batúta says, in telling of a trip on a canal in China. A. D. 1345 (Yule's *Cathay*, II, 499.) He seems to allude to some particular kind or form of ship which used to be thus fitted with fire-throwing apparatus. (The passage is one of those omitted in Lee's abridgment translation of Ibn Batúta.)

† Pp. 170, 172, 174.

‡ Travels into Bokhara, I, 67.

§ Extracts from the Emperor Leo's *Tactica* given by Lalanne (*Feu Grégeois*, p. 21). From Leo's description it would appear that the tubes themselves, when filled with the fire composition, were to be thrown in the face of the enemy.

|| *Lexicon Arabico-latinum*, نَفَّات and نَفَات, p. 2425.

combustible had come to be used in it in place of naphtha.* Beckmann, in his "History of Inventions and Discoveries," quotes an account of the Greek Fire at the capture of Thessalonica by the Saracens in A. D. 904, which says that it was blown into the wooden works of the besieged by means of tubes.† A number of passages mentioning this use of tubes for discharging Greek Fire, in the same century and after, are given by M. Lalanne in his *Recherches sur le Feu Grégeois*.‡ And he surmises that certain tubes which Chateaubriand mentions having seen in a collection of old arms shown to him at Jerusalem, may have been specimens of the implements used for Greek Fire.§ But the idea seems to be of much older date than any of the middle age instances referred to.||

There is nothing to show or suggest that in any of the instances in which tubes were used for Greek Fire, the combustible matter they contained was employed to furnish the motive force, or otherwise than as the material for the fire to be thrown. It is certain that this fire material was frequently or generally liquid, and that this liquid was naphtha or petroleum. It appears also that other inflammable ingredients were sometimes added; and that frequently the dry materials, including one or more of the ingredients of gunpowder, were used alone.

Of reports or noises accompanying fire missiles, which have induced the supposition that something of the nature of cannon was used, or shells exploding by means of gunpowder, the most familiar illustration in India is that given in the account by Firishtah of Mahmúd's battle with Anandpál near Pasháwar, in A. D. 1008, when the elephant on which the Hindu prince rode was alarmed by the sudden noise and fled. The notice of this passage in Firishtah gave occasion to the interesting Note by Sir Henry Elliot, in the original first volume of his "Index to the Muhammadan His-

* As we continue to call a thing a *chandelier* when the lights it carries are no longer candles; and a *volume*, when it has ceased to be a *volumen*, &c., &c. The very word *tormentum*, which Golius here uses, is another illustration.

† *Hist. of Inv. and Disc.*, II, 249. The quotation is from *Leo Allatius*, cir. 1650.

‡ In the times of the Emperor Leo, about A. D. 900; of Const. Porphy., A. D. 950; Alexius, A. D. 1100, &c., *περί τοῦ ὄγρου πρὸς τοῦ διὰ τῶν σιφώνων ἐκφερομένου*, &c., &c., pp. 17, 24, &c. Lalanne quotes also a Russian Chronicle of the tenth century, which speaks of "une espèce de feu ailé" which was discharged "au moyen d'un certain tuyau," p. 29.

§ *Lalanne*, p. 59. "Je remarquai encore des tubes de fer de la longueur et de la grosseur d'un canon de fusil, dont j'ignore l'usage." *Chat., Itinéraire*, II, 313.

|| Casaubon, in his Notes on *Æneas Poliorceticus*, after noticing various ancient fire missiles, says "Observe etiam, ad liquida injicienda, quæ Philo appellat ὄγρὰ τεθερμασμένα, praelongis interdum usos fistulis, quas idem nominat ἐνερῆρας." This Philo wrote in the third century B. C.

torians of India," on the early use of gunpowder in India.* General Briggs had observed, in his translation of *Firishtah*, that in some manuscripts the words *tóp* (cannon) and *tufang* (musket) have been written, in place of the *naft* (naphtha) and *khadang* (arrow) of other copies. A confirmation of the reading *tóp* and *tufang*, Sir H. Elliot says, is given by Wilken, who found this in two copies he had consulted, in which the roar of the cannon also is mentioned. "He considers it not improbable that Greek Fire was used by Mahmúd. Dow boldly translates the word as *guns*."† Sir H. Elliot observes, with reference to *Firishtah*'s account generally, that it does not appear on what authority he rests his statement, as the earlier historians who notice this important engagement do not mention either *naft* or *tóp*.‡ But he adds that from the mention of the use of naphtha ten years later, in an action near Multán, and from the circumstance of naphtha being found in abundance in the country near the scene of the first engagement in question, it is probable that if any combustibles were used on that occasion, they were composed of naphtha. The fact that the fire missile alarmed the elephant, would give no indication that it was of any remarkable or unusual kind. And the noise (*çadá*) is mentioned in those versions of *Firishtah* which speak of naphtha and arrows, as well as in those which use the words *tóp* and *tufang*.§ It seems to have proceeded from the missile itself, not from the discharge of it. There need not be difficulty in supposing that the noise was of the nature of an explosion, if naphtha alone was used, or naphtha with other combustibles, thrown in shells, cases, or tubes, as elsewhere.

* P. 340.

† The ordinary form of the passage in *Firishtah* is—

نامکاه قیل که اندپال برو سوار بود از صدای نفط و خدنگ سراسیمه گشته روی
بگریز نهاد .

Dow's version is—"On a sudden the elephant upon which the prince of Lahore, who commanded the Indians in chief, rode, took fright at the report of a gun, and turned his face to flight." And he says in a foot-note, "According to our accounts there were no guns at this time, but many eastern authors mention them, ascribing the invention to one Lockman." (*Dow's History of Hindostan*, I, 46.) He gives no references to any of these eastern authors.

‡ It may be noticed, however, that the *Kitáb-i-Yamini*, one of the histories referred to by Sir H. Elliot in this passage, speaks in another place (not relating to this engagement) of the use of *átash-didáh bân*, or fire-eyed rockets, which, an English translator remarks, "may have encouraged the idea that artillery was known in Mahmúd's age." (*Kitáb-i-Yamini*, translated by the Rev. J. Reynolds, page 279.)

§ Maurice, writing of this battle, says, "A species of fire weapon seems to have been in use at that time in Asiatic battles; and the sudden explosion of one of those instruments of destruction, close by the elephant on which the prince of Lahore, the generalissimo of the army, rode, &c., &c." Which seems to be Dow repeated, with a slight variation, and evading his "bold" use of the word *gun*. (*Modern History of Hindostan*, I, 253.) Dow's translation was recent at the time Maurice's book was written.

Numerous modern petroleum explosions* have made us familiar with the reports it is capable of producing. Such big demonstrations, of course, can hardly be taken to illustrate what happens with a naphtha shell, but those who have had an opportunity of seeing and hearing a Kerosine lamp explode in their room can understand what it means. The naphtha vapour, like other gases of the same class, when combined with atmospheric air, explodes with a report which, even on a moderate scale, is sufficient, with fiery accompaniment, to alarm an elephant. Explosions are produced, as illustrated by frequent experiences, when the gas, issuing from the ground, or accumulating over the petroleum in wells, is suddenly ignited.† The use of tubes for the discharge of fire missiles, and the accompanying report, might, taken together, easily give occasion, in after times, to the idea that guns and gunpowder were used, though the combustible material was really naphtha or Greek Fire. There is, however, not much to indicate that the noises mentioned were of the nature of what we call a report, and nothing to support the idea that in Mahmúd's time, the beginning of the eleventh century, guns and gunpowder were known.

The use of hollow canes for giving a direction to darts and other missiles is, no doubt, a practice of great antiquity, followed in the present day also by inhabitants of uncivilised islands, and others, and represented among ourselves by our juvenile pea-shooters. In India, bamboos have been used

* The dangerous nature of which called for the English Petroleum Act of 1862, and the Ordonnance du Préfet de Police (relative à l'emploi des huiles de Pétrole) in July, 1864.

† Thus, for instance, at the great abode of naphtha on the Caspian:—"Outside the temple at Baku is a well. I tasted the water, which is strongly impregnated with naphtha. A pilgrim covered this well over with two or three *nummuds* for five minutes. He then warned every one to go to a distance, and threw in a lighted straw; immediately a large flame issued forth, the noise and appearance of which resembled the explosion of a tumbril." (Captain the Hon. G. Keppel's *Journey from India to England*, II, 221.) The French missionary Imbert, quoted by Huc (*Chinese Empire*, Ch. VII), describes an occurrence of the same kind at the mouth of one of the Chinese fire-wells. "As soon as the fire touched the surface of the well, there arose a terrific explosion, and a shock as of an earthquake; and at the same moment the whole surface of the court appeared in flames." "I believe", he says, "that it is a gas or spirit of bitumen." To pass to an illustration on a very small scale, probably many people who have visited the fire temple of *Jedla Mukhi* in the Kángará District, of the Panjáb, will remember the smart pop with which one of the tiny jets of gas issuing from the rock is re-lighted, when it has been accidentally blown out (as they are sometimes by sparrows flying quickly past them). It is the too well-known property of one of the most familiar of the hydrocarbons, the *grison* or fire-damp, to explode with serious results. "Il brûle tranquillement avec une flamme jaunâtre, tant qu'il n'est pas mêlé avec l'air atmosphérique; mais dans le cas contraire, il détone avec violence". "Quelquefois il se dégage seul, mais souvent il est mélangé de pétrole plus ou moins épais et de bitume." (*Beudant, Minéralogie*, 232).



for this purpose, in very early times, with fire-arrows.* And in connection with the use of naphtha tubes in war, it is not uninteresting to notice the employment of canes for naphtha and inflammable gas for economic purposes. Humboldt, in his account of the *Ho-tsing* or fire-wells of China,† and of the *rope-boring* for water, salt, and combustibile gas, which is practised “from the south-west provinces of Yun-nan, Kuang-si, and Szu-tehuan on the borders of Tibet to the northern province of Shan-si”, says “the gas burns with a reddish flame, and often diffuses a bituminous smell; it is conveyed to a distance, sometimes through pipes of bamboo, sometimes in portable tubes, also of bamboo, to be used in salt works, in warming houses, or in lighting streets.”‡ Also for cooking food, as mentioned in an old account by a Chinese writer,§ and for other purposes.|| Huc, describing these fire wells, says “a little tube of bamboo closes the opening of the well, and conducts the inflammable air to where it is required; it is then kindled with a taper, and burns continuously.”¶ In an old review article in the *Athenæum* mention is made of an account in the *Lettres Edifiantes* of oil

* Halhed's *Gentoo Laws*. Introduction, p. 50. See also Moor's *Hindu Pantheon*, p. 299, and *As. Researches*, I, 264.

† *Asie Centrale*, II, 519-540. *Cosmos* (Sabine's transl.), IV, 216.

‡ Here, perhaps, we have the original *πάρεσις* of Prometheus,

The secret fount of fire

I sought, and found, and in a reed concealed it,

Whence arts have sprung to men, and life hath drawn

Rich store of comforts. (*Prom. Vincit.* 107. Prof. Blackie's translation).

Sore ills to man devised the heavenly sire,

And hid the shining element of fire.

Prometheus then, benevolent of soul,

In hollow reed the spark recovering stole.

The far seen splendour in a hollow reed

He stole of inexhaustible flame.

(*Hesiod* by Elton. *Ancient Classics for English Readers*, pp. 24-92).

§ “In all parts of this Province (Shan-si) are found fiery wells which very conveniently serve for the boiling of their victuals.” (*Description of China*, by *Dionysius Kao*, appended to *Ysbrants Ides' Travels*, A. D. 1692, p. 125).

|| “On utilise ces feux naturels pour la cuisson de la chaux, des briques, &c.” Beudant, *Minéralogie*, p. 233.

¶ *Chinese Empire*, Chap. VII. The practice is mentioned also by Sir John Davis. (*The Chinese*, p. 336). And at some of the American oil wells the same method is followed at the present day. “Some of the pumping engines generate steam by the aid of the combustibile gas that is so commonly associated with the petroleum, it being only necessary to conduct it by a pipe from the tanks in which the oil accumulates to the furnace of the engine.” (*Prof. H. Draper of New York. Quarterly Journal of Science, London, 1865, II, 49.*)

that rose from the earth, (at places in China) turned in hollow bamboos in any direction, which burned with a clear flame.* The naphtha gas of Baku is said to be carried about in bottles,† as that of China is in bamboo tubes. It is not improbable that naphtha tubes for hostile purposes may have been suggested by the use of bamboos for the oil and for the gas in the modes above noticed.

Not alone on account of similarity of form, then, but with reference also, it may be supposed, to previous uses of tubes for Greek Fire, and of bamboos for discharging fire arrows, and for carrying petroleum and gas, has the name *canna* been carried forward and applied to modern artillery. The connection of *bomb* and *bombarda* with *bamboo*, however, is not one which illustrates the derivation of the artillery terms from the name of the cane. *Βόμβος*, *bombus*, a hum or noise, is no doubt the origin of *bomba* and *bombarda*. And *bamboo*, (which is not a name it bears in its own countries) is supposed to be derived from the same origin (viâ *bomba*), and to have been applied to it by the Portuguese, with reference to the noisy explosion of the air chambers of the cane when burning.‡ This is possible, though the experience which occasioned the application of the name must be supposed to have been very exceptional.

For indication of the knowledge of fire-arms in India at a very early period, reference has frequently been made to certain passages in ancient books noticed by Halhed in his *Code of Gentoo Laws*. "It will no doubt," Halhed says,§ "strike the reader with wonder to find a prohibition of fire-arms in records of such unfathomable antiquity, and he will probably from hence renew the suspicion which has long been deemed absurd, that Alexander the Great did absolutely meet with some weapons of that kind in India, as a passage in Quintus Curtius seems to ascertain. Gunpowder has been known in China as well as in Hindostan, far beyond all periods of investigation. The word fire-arms is literally in Sanscrit *Agni-aster*, a weapon of fire; they describe the first species of it to have been a kind of dart or arrow tipped with fire and discharged upon the enemy from a bamboo. Among several extraordinary properties of this weapon one was that after it had taken its flight, it divided into several separate darts or streams of flame, each of which took effect, and which when once kindled could not be extinguished;" (on which Halhed says in a foot note—"It seems exactly to agree with the *Feu Grégeois* of the Crusades") "but this kind of *Agni-aster* is now lost. Cannon in the Sanscrit idiom is called *Shēt-Aghni*, or the weapon that kills a hundred men at once, from (*shēte*) a hundred, and (*ghēneh*) to kill."

* Aug. 16, 1862. The reference to the *Lettres Edif.* is not specific.

† Beudant, p. 233.

‡ Elliot, orig. ed., I, 345.

§ Preface, pp. I, li.

The compilation which Halhed published under the above title, *Code of Gentoo Laws*, in 1781, was made from twenty Sanskrit works. It was compiled by eleven Brahmans whom he calls a set of the most experienced lawyers. They were selected, under the orders of Warren Hastings, from all parts of Bengal for the purpose. The compilation, when complete, was translated into Persian, under the supervision of one of these Brahmans, and from the Persian was translated into English by Mr. Halhed. In the compilation itself no indication is given of the particular book (out of the twenty mentioned collectively at the beginning) from which each passage is taken. And in the translator's Preface no references are given to the authorities for his own comments; but he speaks of "the number of enquiries necessary for the elucidation of almost every sentence," which "give him in some measure a right to claim the conviction of the world upon many dubious points, which have long eluded the nicest investigation."* This is all we get from him. The passage relating to fire-arms is in the second section of the preface to the Code, or "the qualities requisite for a magistrate", and it says "the magistrate shall not make war with any deceitful machine, or with poisoned weapons, or with cannon and guns, or any other kind of fire-arms."† This is clearly from the Institutes of Manu. And what Manu says about it is this, "Let no man engaged in combat smite his foe with sharp weapons concealed in wood, nor with arrows mischievously barbed, nor with poisoned arrows, nor with darts blazing with fire."‡ This appears to be the original passage which in the hands of the Bengal Pandits took the form given by Halhed. And it can be assigned approximately to the ninth century B. C. There is nothing here to indicate anything else than primitive fire darts of the kind used in other countries. Mr. Talboys Wheeler, in a note relating to a description in the Mahábhárata of a variety of arms, says that, in the original, mention is made, among other weapons, of "arrows, producing fire", and he says "The Brahmans in the present day point to the fire-producing arrows as proofs that the ancient Hindus were possessed of fire-arms."§ There are other ancient notices of war missiles or engines which (with more reason than this specific mention of *arrows*) have given occasion to this belief, but there is nothing to indicate what they were. "From the frequent mention of the *Agni-astra*, or fire-arms", Bábu Rájendralála Mitra has observed, "it is to be inferred that the Hindus had some instruments for hurling shells or balls of burning matter against their enemies; but no description of any such has yet been met with."|| The *Maháyantra*, or great engine, and the *Sataghni*, or centicide,

* Introduction, p. xi.

† P. cxiii.

‡ Institutes of Manu, translated by Sir W. Jones, VII, 90.

§ *History of India*, I, 88.

|| *Antiquities of Orissa*, I, 121.

he refers to as being mentioned in the ancient books but not described. Bohlen* alludes to the mention in the Puránas of a kind of cannon; but he does not give the name, or any definite reference.

Colonel Tod says, "We have, in the Poems of Chand, frequent indistinct notices of fire-arms, especially the "nal-gola", or *tube-ball*; but whether discharged by percussion or the expansive force of gunpowder is dubious. The poet also repeatedly speaks of "the volcano of the field", giving to understand great guns; but these may be interpolations, though I would not check a full investigation of so curious a subject by raising a doubt."† It can scarcely be questioned now, however, that the doubt was justly raised. The interpolation (if this is the right mode of explaining the passage) has a sort of parallel in a picture, described by M. Lalanne, inserted in 'Le Livre de la Vie et Miracles de Monseigneur S. Loys', in which picture "les sarrasins, d'un côté, se défendent avec des espèces de mousquets à mèche, et, de l'autre, le navire royal porte une rangée de canons."‡

Some kind of fire missile is believed by Prof. H. H. Wilson to be intended in a passage in the *Mahá-nátak* or *Hanumán-nátak*, to which he thus refers in his outline of the play. "In the opening of the thirteenth Act, *Rávana* levels a shaft at *Lakshmana*, given him by *Brahma*, and charged with the fate of one hero: it should seem to be something of the nature of fire-arms, a shell or a rocket, as *Hanumán* snatches it away, after it has struck *Lakshmana*, before it does mischief. *Rávana* reproaches *Brahma*, and he sends *Náreda* to procure the dart again, and keep *Hanumán* out of the way."§ There is not much here to show the kind of missile, except that it does *not* seem to have been anything like a shell or rocket. The play belongs to the tenth or eleventh century. Of the nature of "the Agneya weapon, one of the celestial armoury, or the weapon of fire", mentioned in another Hindu drama, the *Uttara Ráma Charitra*, there is only the indication given in the "fiery blaze" attributed to it; by which, as in the other case, some kind of burning arrow is probably meant.||

While there is no very distinct indication of the nature of the machines or missiles thus referred to in ancient Hindu books, the idea of fire-carrying arrows seems to have been familiar in India, as elsewhere, from early times; and the use of such fire-arrows, discharged from a bow or by other means, is seen to range over a long period. In the *Ayodhyá Mähátmya*, of which a translation has lately been published in the Journal of the Asiatic Society of Bengal,¶ it is related that on a certain occasion the Rájá *Kúsha*, getting

* *Das Alte Indien*, II, 63, 64.

† *Annals of Rajasthan*, I, 310. Note.

‡ *Recherches sur le Feu Grégeois*, 55.

§ *Hindu Theatre*, Vol. III. Appendix, 58.

|| *Id.*, Vol. II, *Uttar. Ram. Char.* 92.

¶ *J. A. S. B.*, Part I. 1875, pp. 137, 138.

enraged, "put an arrow of fire on his bow, to dry up the water of the Sarayú."* The notice in *Manu* appears to be the earliest. And nearly two thousand years after his time, arrows of this kind were in use in Kashmír; towards the end of the century in the beginning of which Mahmúd had been launching naphtha balls against his opponents in the neighbouring plains of the Panjáb. This is M. Troyer's translation of the passage in the *Rájá Tarangini* in which they are mentioned. "Quand il ne restait que trois heures du jour, les ennemis, encore une fois ralliés, exaspérés par la défaite, marchèrent pour combattre Kandarpa. Alors il lança dans le conflit des flèches de fer, lesquelles étaient ointes d'huile d'herbes, et mettaient en feu les espaces qu'elles traversaient."† This Kandarpa was the minister of two kings of Kashmír, Utkarcha, who had a short reign in A. D. 1090, according to M. Troyer's chronology,‡ and Harcha, who came to the throne the same year and reigned twelve years.

Besides the specific notices of arrows, and more indefinite references to the undescribed weapons called by the names abovementioned, there are other passages in the ancient Hindu books relating to the use of combustibles in war. "In the *Udyoga Parva* of the Mahábhárata", Rájendralála Mitra writes, "Yudhisthira is described as collecting large quantities of rosin, tow, and other inflammable articles for his great fratricidal war; but nothing is there said of any engine with which they could be hurled against his enemies."§ Another part of the Mahábhárata mentions the use of igneous appliances in aid of defensive arrangements, and here also without any indication of the way in which they were used. It is in connection with the account of the *Aswamedha* or horse sacrifice. The horse had entered the country of *Manipura*, and approached the city of *Babhru-vahana*. "On the outside of the city were a number of waggons bound together with chains, and in them were placed fireworks and fire-weapons, and men were always stationed there to keep guard."||

* This *Máhátmya* is ascribed to *Ikshvaku*, son of *Manu* and king of *Ayodhyá*, (*Muir's Sanscrit Texts*, I, 115).

† Troyer's *Rája Tarangini*, Ch. XII, 983, 984.

Was any such simple application of inflammable matter to pointed weapons ever practised in Britain? "Go, thou first of my bards, says Oscar, take the spear of Fin-gal. Fix a flame on its point. Shake it to the winds of heaven." (*Ossian, The war of Caros*.) Whether this fire at the spear's point (which must be meant for a signal in this instance) may be meant to indicate also a familiarity with its application to other uses, is doubtful.

‡ Prof. H. H. Wilson assigns dates 23 years later. (Preface to *Ratnavali*, Hindu Theatre, Vol. III.)

§ *Antiquities of Orissa*, I, 121.

|| *Talboys Wheeler, History of India*, I, 405.

Mr. Fergusson has observed, with reference to siege scenes represented in the sculptures of one of the Sanchi gateways (supposed to have been erected about the beginning of the Christian era), that no engines of war are shown, or indications of any attempt to set fire to the place. "In these respects", he says, "the Hindus seem to have been very much behind the stage we know from the Nineveh sculptures that the Assyrians reached at a much earlier age."* And Bábu Rájendralála Mitra, who makes reference, in the work before quoted, to the siege scenes in the Sanchi bas-reliefs, and to the absence of any indication of engines for casting fire to a distance, or for battering, adds that the martial processions and battle scenes at Bhuvaneswara are also devoid of such representations.† These, however, are only pieces of negative evidence, and do not, by themselves, go far. There are European mediæval pictures of siege operations in which no engines of war are represented, or indications of the use of fire, but only such means of attack and defence as are shown in these Indian sculptures.‡ It may be, and it seems probable, that the Hindus were behind Western nations in the knowledge of the mechanical appliances for such purposes, (as the Chinese were, so late as the thirteenth century of our era§) but they did use fire, and the accounts in books give us what the sculptures omit. Yet we may conclude that nothing more advanced in the way of fire weapons was known in India in ancient times, than was in use in other countries;|| and that the application to these old Indian weapons, of terms belonging to weapons of our own time, is an illustration of the inadvertent (or at least in some way erroneous) transference of familiar ideas to times and places to which they do not belong. Shakspeare brings in cannon in the time of King John.

The prohibition in Manu is probably the earliest notice on record of fire arrows, unless, as has been supposed, they are referred to in Psalm

* *Tree and Serpent Worship*, p. 141.

† *Antiquities of Orissa*, I. 121.

‡ Wilkinson says, "We may suppose" that the Ancient Egyptians used fire missiles in sieges (I, 363), but there is nothing in the pictures or sculptures to countenance this supposition, and he mentions nothing in support of it.

§ See Yule's *Marco Polo*, 2nd Ed., II, 152. The accounts of the employment of the Polos in the construction of the engines to aid Kublai in the siege of Siangyang are confused; but it appears at all events that Western engineers were employed, and from some accounts, that they were specially sent for. Not that the Chinese and their enemies were altogether unacquainted with war machines, but the people of the West were ahead of them.

|| Nothing of much value is obtained from the statement in the *Dionysiaca* of Nonnus that the followers of Bacchus, in his invasion of India and battle with Deriades, fought with brands and bolts of fire. (*As. Res.*, XVII, 617.) The question whether the materials for the Indian part of the poem were derived from an Indian source is discussed in the paper here referred to, by Prof. H. H. Wilson.

lxxvi. 3. "The arrows of the bow" might be translated "the glowing fires", or "the glittering or flashing (arrows) of the bow", "or rather perhaps", says Parkhurst, "the βέλη πεπερωμένα, fiery or fire-bearing arrows, such as it is certain were used in after times. So Montanus, *jacula ignita*."* The Psalm belongs to the century before Manu, or a little more than ten centuries B. C., if the Asaph with whose name it is connected was the contemporary of David. And to a time about three centuries later, the end of the eighth century B. C., if he was Asaph, "the recorder" of King Hezekiah's time. But it seems most probable, notwithstanding Parkhurst's suggestion, that in this instance no reference to fire arrows is intended. Though the literal rendering may be as above, it may be only a poetical figure of a not uncommon kind.† A more probable reference to fire-bearing

* Parkhurst, Heb. Lex. s. v. הָעֵר, the meanings of which, as a noun he gives as "red hot coal", "glowing fire", "flashes of lightning". Gesenius translates it *flame*, and refers to its use in Psalm lxxviii. 48. The same word in Arabic, رَشَق, *rishq*, is interpreted by Golius, "Jactus rapidior vel vibramen teli. Certus jaculandi seu petendi modus." The LXX render the words referred to, in Ps. lxxvi. 3, τὰ κράτη τῶν τόξων, followed by the Vulgate, *potentias arcuum*.

† Thus in other Psalms we have, by a sort of reverse simile, *arrows* used for *lightning* (Ps. xviii. 14; cxliv. 6. Also Hab. iii. 11; Zech. ix. 14). In the *Tārīkh i Yamīn*, "arrows ascending towards them like flaming sparks of fire." (*Dowson's Elliot*, II, 34.) The idea of flame or lightning is attached to bright and quick-moving weapons of various kinds. Thus in Nahum iii. 3. A similar figure probably is intended in Gen. iii. 24, so also Virgil's

vaginâque eripit ensem

Fulmineum ——— (Æn. IV. 580).

"The sword is in your hands. Let Jessulmer be illumined by its blows upon the foe." (*Tod's Rajasthan*, II, 251). The epithet *blazing* is mentioned by Rājendralāla Mitra as applied in a passage of the *Rig Veda* (IV, 93) to swords, lances, and other weapons. (*Antiquities of Orissa*, I, 119.) Khwāndmīr, in a description of a battle, speaks of the "flame-exciting spears." (*Habīb us-siyar*. *Dowson's Elliot*, IV, 172). And 'Unsurī of Balkh, in one of his odes, "Hadst thou seen his spears gleaming like tongues of flame through black smoke, &c." (*Elliot*, IV, 516). And Homer II. X, 153, thus rendered by Chapman, in prosaic fashion telling us it was a reflection—

His spear fixed by him as he slept, the great end in the ground,
The point that bristled the dark earth cast a reflection round,
Like pallid lightnings thrown from Jove ———.

Pope, more happily,

Far flashed their brazen points

Like Jove's own lightning.

"In that arrow the terrible god hurled forth the fire of wrath, &c." (*Mahādeva's Equipment for Battle*, *Muir's Sanscrit Texts*, IV, 225.) This too is probably figurative fire, though it is added that he discharged it against the castle of the Asuras, and the Asuras were burnt up, p. 226.

Krishna and Arjun are sent by Mahādeva to a lake where he had deposited his bow and arrows. They see two serpents, one vomiting flames. The serpents change their form and become bow and arrows, p. 186.

arrows is in Psalm cxx. 4. The word there used "coals of juniper" (more properly *broom*) seems to refer to actual burning matter.

Between the ancient Hindu writings which mention fire-arrows in early days in India, and the Muhammadan historians who tell of naphtha-throwing, in the time of the first Arab invasions of Sind, we get some indications, from a different source, of the use for similar purposes of the petroleum of the north-west districts of the Panjáb, about fourteen hundred years before it was used in Mahmúd's battles in that quarter. The oil mentioned by Ctesias as used in the attack of cities, which was launched against the gates in earthen vessels, and set fire to everything around, with a flame which could not be extinguished by any ordinary means, is obviously petroleum, though his story is that it was obtained from a large animal found in the Indus. And the animal described, though called a worm (σκώληξ), is as obviously (in spite of errors and exaggerations with regard to it as well as to the oil) a crocodile.* It was seven cubits in length, and had a skin two fingers thick, and remarkable teeth. It used to come up on the land at night, seize any animals it could find, and drag them into the water to satisfy its hunger.† Philostratus repeats the story, noticing also, as Ctesias does, that the oil was prepared only for the king.‡ He transfers the animal to the Hyphasis; but from the nature of the materials for his work some inaccuracies may be expected. The story is essentially the same and is probably taken from Ctesias. It is not difficult to see in these accounts a confusion of separate facts. The petroleum obtained in the districts on both sides of the Indus below Atak is for the most part gathered from the surface of water. Ctesias refers in another passage to the oil which floats on certain lakes or ponds in India, and springs discharging oil.§ Again, the highly inflammable mineral oils and other products of the same class have been very generally believed to be of animal origin.|| In discussing

* That it should be called a worm, is perhaps not very surprising. Long after that time, people did not know exactly what kind of animal it ought to be reckoned. Thomas Herbert, (A. D. 1638) writing of the "hatefull crocodile" of Sumatra, calls it "this detested beast, fish, or serpent, by seamen improperly call'd Alligator." (*Some Yeares Travels*, p. 323.)

† *Ctesia Ind. Historiæ Excerptæ*, Gronovius, p. 664.

‡ *Vit. Apollon. Tyan. III*, 1. The petroleum collected from a spring in the south of Persia, we are told by Dr. Fryer, who travelled in that country in 1674, used to be carefully guarded, and taken for the king's use only. (*Nine Years' Travels*. J. Fryer, M. D. Cant., p. 318.) The story of its discovery, on one of king Faridún's hunting parties, and of its being reserved for the king's use, is given in Honigberger's *Thirty-five years in the East*, s. v. *Asphaltum Persicum*, p. 238. Also in the *Makhzan i Adwiyah* by Muhammad Husain of Dihlí, A. H. 1180.

§ *Ctes. by Gronov.*, 666.

|| Modern researches on the nature of some of the great deposits of petroleum in the United States and Canada, and elsewhere, have led to the conclusion that they are

the apparent description by Ctesias of the crocodile, and with reference to the question whether oil is obtained from that animal, Sir Henry Elliot, in the note before referred to, mentions the result of an investigation on the subject in which Prof. H. H. Wilson took part. But there is no mistake about Crocodile oil. Not only, as Sir H. Elliot observed, is it mentioned in native works on *Materia Medica*, but at the present day it is one of the recognised commercial products of this country, and will be found duly recorded No. 8282 in Dr. Forbes Watson's comprehensive list, prepared in connection with the scheme for an Industrial Survey of India. If we accept the crocodile, the story takes a tolerably compact form and admits of easy and plausible explanation. Here was an inflammable oil, of remarkable properties, believed to be of animal origin, and obtained from the surface of waters on both sides of the Indus. Here was a big water animal, of frightsome appearance and character, residing in the Indus, and from which oil was obtained. It is a very natural supposition that Ctesias, having some version of these facts before him, put this and that together, and like Mr. Pickwick's friend who wrote on Chinese Metaphysics, "combined his information."*

in great part the product of animal decomposition. (*Prof. Archer, in Art Journal of August, 1864. Prof. Draper of New York, in Quarterly Journal of Science, (London) Vol. II, 1865, p. 49. Prof. Ansted, Qu. Journal of Science, II. 755*). The substances of this class which, according to popular belief, are most directly of animal origin, are *ambergris*, and the dark bitumen known as *mūmidī*, highly esteemed in India and Persia as a medicine. With regard to *ambergris*, believed to be a kind of petroleum issuing from rocks and hardened in the sea, modern opinion is coming round to the belief that whether or not it comes into the sea in this way, and is then swallowed by the monsters of the deep, it is actually obtained from the whale. (*Bennett's Whaling Voyage round the Globe*, quoted in Yule's *Marco Polo, II, 400*. The animal is the *Physalus macrocephalus*, according to *Linnaeus (Gmelin, XIV, 495)*. See also *Sindbad's Fifth Voyage, Lane's Thousand and One Nights, III, 66*, and note, p. 108. *Le Gentil, Voyages dans les Mers de l'Inde, II, 84. D'Herbelot, Bibl. Or., s. v. Ghiavambar. Al-Mas'ūdī, Meadows of Gold, ch. XVI. Renandot's Ancient Accounts of India and China by two Muhammadan Travellers, p. 94*. The precious *mūmidī* is understood a little more exactly. But at the present day it is popularly believed to be obtained from land animals (*sotto voce* human) by a process exactly similar to that described by Ctesias for extracting from the big beast of the waters the inflammable oil used in sieges in India. (See *Vigne's Ghuzni, p. 61*,—"the asphaltum so well known in India by the name of negro's fat".) Two years ago there was much alarm among the native servants and others at some of our hill stations in the Panjāb, occasioned by a rumour that a demon who practised the horrible manufacture was prowling about nightly, seizing unwary and unprotected people, to furnish material for the preparation of the first-class *mūmidī*.

* It is only by a poetical coincidence, and not with any reference to the combustible product supposed to be obtained from it, that the crocodile itself is described in the book of Job as breathing fire. "Out of his mouth go burning lamps [or blazing torches,

The account given by Philostratus of the defence of forts in India by thunderings and lightnings which the defenders had power to discharge on their assailants,* refers, no doubt,—if any real thing is referred to,—to some description of petroleum missile or Greek Fire. But it is most likely only a reference to the mythical celestial weapons and command over the elements.† Whenever petroleum or naphtha was obtained, its use for hostile purposes has been appreciated, and the forms of its application have been various. One of the devices of Iskandar Zul-Karnain, in preparing for encounters with the Hindus, as related by Mír Khwánd‡ was to make a number of hollow images in the form of soldiers, filled with dry wood and naphtha, to be set fire to in the midst of the battle. The great junks of the Chinese in the middle ages carried arms and naphtha to defend themselves against the pirates of India.§ The material used for fire-missiles in China in the beginning of the tenth century was known by the name of the "oil of the cruel fire."|| A recent investigator on the subject of Chinese oils states that the petroleum of Shansi, Lechuen, and Formosa, is said to have been formerly employed by the Chinese in Greek Fire compositions.¶ For use in fire-rafts for destroying other vessels and wooden structures, petroleum is of course very suitable, and has been frequently so used.** And thrown upon ships from a distance, or directly applied in other ways, it well serves the same purpose.†† Bituminous fire shells are noticed by Tasso as used in the First Crusade (A. D. 1099).‡‡ In a descriptive Catalogue of

as in a translation published in the *Calcutta Christian Intelligencer*, Feb. 1862] and sparks of fire leap out. Out of his nostrils goeth smoke, as out of a seething pot or caldron. His breath kindleth coals, and a flame goeth out of his mouth." Ch. xli. 19-21.

* *Vit. Apollon. Tyan. II*, 14.

† See *Uttara Rāma Charitra* (in Wilson's *Hindu Theatre*), pp. 14, 92, 96, &c.

‡ *Rauzat-uç-çafā*, Shea's translation, p. 400.

§ *Reinaud, Mémoires sur l'Inde*, p. 300.

|| *Grose's Military Antiquities, II*, 309.

¶ *Dr. F. Porter Smith, on the oils of Chinese Pharmacy and Commerce. Journal of the Pharm. Soc.* 1874. (The reference is taken from a newspaper review.)

** *Lalanne, Feu Grégeois*, p. 45, &c., &c.

†† "At Dely there is a fountain of oil which is said to be unextinguishable when once it is set on fire; and with which the king of Achen burnt two Portuguese Gallies near Malacca about 8 or 10 years ago." *M. Beaulieu's Voyage to the East Indies*, A. D. 1619 (in *Harris's Collection*, p. 250). The irresistible rapidity with which timber touched with petroleum is consumed by fire is illustrated in the recent destruction of the *Goliath* training ship.

‡‡ *Jer. Del. XII*, 42 (Fairfax's version)

Two balls he gave them, made of hollow brass,

Wherein enclosed, fire, pitch, and brimstone was.

misses the *bitumi* of the original.

Arabic Military books,* mention is made of a peculiar mode of carrying fire into a fight, on the face of shields furnished with large hollow bosses which were filled with naphtha and had matches applied at one or more little apertures. The device seems rather stupid and impractical, but these shields are said to have been used in the battle before Mecca, at the attack on that place by Hajjáj-bin-Yúsuf, before referred to, in A. H. 73 (A. D. 692.) Another form of combination of offensive with defensive arms has been devised in more modern times, which is not much better. The Yárkandís, as we learn from Sir D. Forsyth's account of his embassy, have "large circular shields gaudily painted with dragons and other hideous monsters on one side, and concealing, on the other, a gun-barrel set in a socket of wood, and serving also as a handle whereby to carry the shield."†

It has been a question whether the *scorpions*, often mentioned as offensive missiles, are to be taken in their literal meaning, or as representing some kind of actively inflammable preparation, called by this name on account of the sharp style of its attack and painful nature of its effects; just as some of the engines used in war bear the names of familiar animals with reference either to their form and appearance or to their mode of application.‡ One of these engines was called a scorpion.§ This question has been discussed by Sir Henry Elliot in the volume before referred to,|| in connection with the account in the *Túríkh-i-Alfí* of the capture of the city of Násibín, in the time of the Khalifah 'Omar, in the seventh year after the death of Muhammad, when large black scorpions are said to have been made use of in the attack. In support of the supposition that "a combustible composition formed of some bituminous substances" may have been meant, he observes that the ancient Indian weapon or rocket called *satagni*, the hundred-slayer, also signifies a scorpion. And the fireworks mentioned in the book translated by Casiri, which gives occasion to Hallam's query about the *pulvis nitratus*, are described as being "in the form of scorpions". But though the name has been applied to fireworks and fire missiles as well as to a mechanical engine of war, yet seeing the distinct mention of these animals in many instances, (and of other offensive animal missiles thrown into besieged places) there need be no difficulty in accepting the literal interpretation. If the situation of the city of Nisibis (with reference to the capture of which place with the aid of scorpions the matter has been

* *Fihrist al-kutub fi 'ilm il-harb*, p. 64.

† *Report of a Mission to Yarkand*, in 1873, p. 13.

‡ Testudo, Musculus, Aries, Onager, Scorpio, Chat, Sow, &c., and, ironically, the *Bride* (*arús*), as tender an instrument, in its way, as the *maiden* in our own country.

§ Said to have been invented by the Cretans. *Plin. N. H.*, VII, 57.

|| *Bibl. Index to the Moh. Hist. of India*, Calcutta, 1849, 146, 163. Dowson's Edition, V, 152, 550.

discussed) in a country supplying bituminous material, which actually was used for fire missiles in that neighbourhood, favours the former idea, at the same time it is a place noted for real scorpions, in modern as well as ancient days.*

Among the preparations for the great war on the plain of *Kurukshetra*, it is related that Duryodhana, having fortified his trench with towers, supplied the defenders of the towers with "pots full of snakes and scorpions, and pans of burning sand and boiling oil."† And there are numerous instances since that time of the similar use of the living animals.‡ The Emperor Leo gives instructions, in his *Tactica*, for this employment in war of serpents and scorpions.§ Larger creatures, dead and living, less directly hurtful but unpleasant, have often been thrown into besieged places for the annoyance of the defenders. Human beings have occasionally been projected in this way from the military machines;|| and it is related that on a certain occasion an unlucky engineer was accidentally hurled into a fortress by one of his own great engines.¶

The introduction of improved devices for war missiles, and particularly of gunpowder artillery, was, from various causes, slower in some countries than in others. Some nations from their position and opportunities, or by

* *Rev. J. P. Fletcher, Notes from Nineveh, I, 164.* The work published under the name of Ibn Haukal also mentions both serpents and scorpions in the neighbourhood of Nisibis; (*Ouseley's Geography of Ibn Haukal, 56*) and, it may be observed, also mentions another place noted both for naphtha springs and for a species of scorpion more destructive than serpents (p. 77).

† *History of India. J. Talboys Wheeler, I, 275.*

‡ Imperavit quam plurimas venenatas serpentes vivas colligi, easque in vasa fictilia conjici. * * Pergamenae naves quum adversarios premerent acrius, repente in eas vasa fictilia, de quibus supra mentionem fecimus, conjici coepta sunt. (*Corn. Nep. Hannibal, X. XI.*) Frontinus notices this incident among his devices of war, but seems to make a mistaken reference to the occasion. "Hannibal regi Antiocho monstravit ut in hostium classem vascula jacularentur viperis plena, quarum metu &c." (*Frontini Stratagemata IV, 10*). Other instances in the East. "And Khalaf cast at them pots full of serpents and scorpions from slinging machines." (*Kitdb-i-Yamīn, Memoir of Sabaktagīn. Reynold's Transl., 54*). "Et præterea habebant et ignem Græcum abundanter in phialis et ducentos serpentes perniciosissimos." (*Itinerarium Regis Richardi, XI, 42, quoted by Lalanne, p. 44.*

§ *Lalanne, Feu Grégeois, p. 27.*

|| *Yule's Marco Polo, II, 124.* Ibn Batūta relates an occurrence of this kind at Dihli in 1325. (*Travels of Ibn Batuta, by Lee, 145.*)

¶ A modern artist has improved upon this by a voluntary performance of the same kind, according to a story which has appeared in recent English newspapers (Dec. 1875). The story is that a Parisian acrobat gets himself flung up to the high trapeze by being shot from a mortar; and that, on a late occasion, an overcharge of powder, or some other small error in the adjustments, sent him a little further than he intended, and landed him in the front row of the spectators.

reason of their aims and requirements, have been more receptive than others of such improvements in military matters. And some, pursuing careers of conquest or of enterprise, have been the chief means of communicating the knowledge of these improvements and inventions, which they themselves had acquired and brought into use. The Arabs early used the resources of the countries in their possession for the preparation of fire compositions for use in war, and, among others, (as we have seen) of gunpowder applied to fireworks; but their knowledge of the application of gunpowder to artillery there is every reason to believe was derived from Europe. Their active and extensive inroads into other countries, East and West, were long anterior to the days of gunpowder artillery.* The Spaniards, Prescott says, deriving the knowledge of artillery from the Arabs, had become familiar with it before the other nations of Christendom.† This is perhaps not well established. But the Spaniards and Portuguese, whether or not the knowledge was thus received and thus familiar, were the means of conveying it to eastern and other countries with which they traded and fought, or in which they settled; and sometimes they found themselves forestalled. If some people were specially apt in adopting the new weapon, in other countries there were hindrances of different kinds in the way of its introduction or general use. Sometimes of course the reason for artillery not being used was that it was not wanted. Then the cannon in early days were very cumbrous and very troublesome. The first field-pieces were so clumsy and so difficult to manage, that (as Prescott mentions) Machiavelli, in his *Arte della Guerra*, recommends dispensing with artillery.‡ Hume believes the French had cannon at the time Creci was fought, but left them behind as an encumbrance. It is not surprising, then, that some Asiatic nations, and others, were slow, as we find, in bringing gunpowder artillery into use. Few of those who had the means, failed, it may well be believed, to adopt this new instrument of war from under-rating its power and importance.‡

* "What an exalted idea must we not form of the energy and rapidity of such conquests when we find the arms of Islam at once on the Ganges and the Ebro, and two regal dynasties simultaneously cut off, that of Roderic, the last of the Goths, of Andalus, and Dahir Despati in the valley of the Indus." (A.H. 99., A.D. 718). *Tod's Annals of Rajasthan*, I, 243.

† *Ferdinand and Isabella*, I, 277.

‡ And more probably from the feeling that they were happier days when it was not known: as good George Herbert sings,—

Deerat adhuc vitiis nostris dignissima mundo
Machina, quam nullum satis execrabitur ævum.

Exoritur tubus, atque instar Cyclopis Homeri
Luscum prodigium, medioque foramine gaudens!

The number of guns that could be brought into use was for a long time very moderate, and they therefore did not at once supersede the previous contrivances. The English were among the first, after the properties of gunpowder had become known, to employ big guns. It was in the early part of the fourteenth century that this mode of applying gunpowder was first practised in Europe; and from that time it slowly advanced.* The *Ballistarius*, once an important official in our English fortresses, made way, perhaps more rapidly in Britain than elsewhere, but not all at once, for the *Master Gunner*. In the East, the *Naft-andáz*, or naphtha-thrower, was the co-adjutor of the *Manjaníkí* who worked the engines; and these have in due course been succeeded by the familiar *Gol-andáz* of the Indian native armies.†

Guns were brought into the field by the English at Creci in 1346. It is said by Tytler and others that Froissart makes no mention of the guns

Accedit pyrius pulvis—&c., &c.

Dicite vos, Furiae, qua gaudet origine monstrum?

Inventa Bellica.

Milton, with the same feeling, ascribes the invention of both cannon and powder to infernal agency. *Par. Lost, B. VI.*

* Chaucer, in a poem written probably about the end of the third quarter of the fourteenth century,—the transition period of artillery in Britain,—borrows illustrations from both the old and the new descriptions of military engines. It is in a didactic passage in "*The House of Fame*", in which he discourses on the nature of sound.

Soun is nought but air y-broken
And every speche that is spoken,
Whe'r loud or privy, foule or fair,
In his substance ne is but air.

After this, in noticing various descriptions of sound, he says,

And the noise which that I heard,
For all the world right so it fered,
As doth the routing of the stone
That fro the engine is letten gone.

And again,

Throughout every region
Y-went this foule trompes soun,
As swift as pellet out of gonne
When fire is in the powder ronne.*

† It is by a fine oriental figure of speech, and with no reference, now, to pyrotechnic functions of any kind, that another familiar Indian official, of humble rank, is styled a *Barq-andáz*, or 'darter of lightning'.

* One of the early kinds of cannon "was fired by applying a metal bar made red hot in the furnace to the powder contained in the chamber." *Viollet le Duc, Mil. Arch. of Mid. Ages*, 172.



at Creci. But a recent reviewer has indicated two manuscripts of Froissart in which they are distinctly mentioned as used by the English on that occasion. And he gives some quotations.* Froissart had spoken of guns employed at an earlier date,—at the siege of Stirling by the Scots in 1341. Tytler (*Hist. of Scotland, Vol. II.*, p. 60) says this is not corroborated by contemporary historians. But at a still earlier date they had been used in Britain, if, as is generally understood, guns are meant by the *war-crakes* (*crakys of weir*), mentioned by Barbour as having been first seen by the Scots in their skirmishes with Edward III's forces in Northumberland in 1327.†

But long after those days, in Britain and other countries where gun-powder and its modern application were well known, the employment of cannon had not made great progress. In India they were used by Bábar, as largely, it would seem, as the means and skill available would permit; and he was not much behind other countries in this respect. In 1528, when he had the aid of artillery in forcing the passage of the Ganges near Kanauj, he says, "For several days, while the bridge was constructing, Ustád 'Alí Kúlí played his gun remarkably well. The first day he discharged it eight times; the second day sixteen times; and for three or four days he continued firing at the same rate."‡ This was just fifteen years after Flodden, when artillery practice was at much the same stage in Britain.

Their marshall'd lines stretched east and west,
And fronted north and south,
And distant salutation pass'd
From the loud cannon mouth;
Not in the close successive rattle

"Li Engles—descliquierènt aucuns kanons qu'il avoient en le bataille pour esbahir les Genevois."

Les Engles avoient entre eulx deulx des bombardieaulx, et en firent deulx ou trois quier sur ces Genevois." And from another chronicle (St. Denis) the reviewer quotes "Lesquels Anglois giettèrent trois canons: dont il advint que les Gènevois arbte tiers qui estoient au premier front tournèrent les dos et laissèrent à traire; si ne sceut r sé ce fu par traison, mais Dieu le sceut." *Saturday Review, July 24th, 1875.* Review of *Edward III.* by Rev. W. Warburton, M. A. The reviewer makes these notes with reference to an observation of the author that Villani is the only historian who mentions the employment of cannon at Creci.

* Tytler, *Hist. of Scotland, IV*, 150. Note. Sir Walter Scott also gives a note in the *Masterlsey of the Scottish Border* on this mention of guns by Barbour. Some early notices of powder and cannon are referred to by a writer in *Notes and Queries*, May 15th, 1869. The earliest date mentioned is *cir.* 1326.

† *Memoirs of Baber, tr. by Leyden and Erskine*, p. 379; *Erskine, Hist. of India under the first two sovereigns of the House of Taimur, Baber, and Humayun*, I. 486. *Dowson's Elliot*, V, 279.

That breathes the voice of modern battle,
But slow, and far between.*

It was not till after many improvements and much further experience, during a long course of years, that things came to be done after this other manner.

The walls grew weak; and fast and hot
Against them pour'd the ceaseless shot,
With unabating fury sent
From battery to battlement;
And thunder-like the pealing din
Rose from each heated culverin.†

Bábar gives a name to the gun which his engineer and master-gunner, 'Alí Kúlí, managed in the way above mentioned:—"the gun which he fired was that called *Deg Ghází*, the victorious gun"—) from which it is seen that he had others, besides one which was put *hors de combat* at an early period in the engagement ("Another gun, longer than this, had been planted, but it burst at the first fire"). But it is not likely that the many other carriages (*'arába*), mentioned in other accounts of his war equipment,‡ mean *guns*, but rather, (as supposed by M. Pavet de Courteille, the latest translation of Bábar's Memoirs, and by Prof. Dowson) carts of some kind, used for transport of ordnance stores and for other purposes in connection with the guns. Leyden (or Erskine) translates the word as *guns*, even when mentioning so large a number as seven hundred. This is out of the question. It appears indeed from other notices of Bábar's artillery that on some occasions, a single piece was all he had, though at other times he had several.§ "About noon-day prayers, a person came from Ustád with notice that the bullet was ready to be discharged, and that he waited for instructions. I sent orders to discharge it, and to have another loaded before I came up."|| A deal of work has often been done with a single gun. But the possession of the new weapon did not confer a very formidable superiority when this was the whole of the artillery.¶

* Marmion, VI, 23.

In the early days of artillery in Europe "it was usual for a field-piece not to be discharged more than twice in the course of an action." Prescott, *Ferdinand and Isabella*, I, 87.

† Byron, *Siege of Corinth*.

‡ Dowson's *Elliot, Tuzak-i-Bábari*, IV, 268, and Note.

§ James's ordnance, at Flodden, as given by Pitscottie, consisted of "seven cannons that he had forth of the Castle of Edinburgh, which were called the Seven Sisters, casten by Robert Borthwick, the master-gunner, with other small artillery, bullet, powder, and all manner of order, as the master-gunner could devise." *Marmion*, Note 3 D.

|| *Tuzak-i-Bábari*, Dowson, IV, 285.

¶ Reminding one of Hood's account of the arrangements for quelling an election riot, as supposed to be described in the letter of a country cousin at the scene of action.

India seems to have freely adopted the new instrument of war, while Persia was slow to use it, even after experience of its powers, and even after beginning to make use of it, did not take to it very kindly. The brass ordnance which contented the Indian commanders in Bábar's time, and after, was doubtless of a somewhat rough construction, as we read of Sher Sháh Súr, in 1543, issuing an order to his people to "bring all the brass in camp and make mortars (*degħa*) of it", to bombard the fort of Ráísín; and they brought their "pots, dishes, and pans," and made them into mortars.* This shows at all events a ready appreciation of the value of artillery. Something more pretentious than these extempore mortars, and more cumbersome, were the guns which, very soon after this, (in 1551) we hear of Islám Sháh (Sultán Salím) taking with him from Dihlí to Láhor, after Mírzá Kám-rán's flight from the court of Humáyún, to take refuge with him. Starting in haste he could not get a sufficient number of oxen in the villages near Dihlí, and "each gun was pulled by 2000 men on foot."†

At this time, and for long after, Persia was not so far advanced. One of the Jesuit missionaries, writing from Ormus in 1549, says of the *Soldanus Babylonicus*, the ruler of the territories adjoining, "qui modo *Catheamas* appellatur", (that is *Sháh Tahmásp*) "Hic bona ex parte Persis imperat, et in Regibus potentissimis jure optimo censetur. Eius robur omne ac vis copiarum equitatu constat, et peritissimis sagittariis. Nullis bombardis nec aliis huius generis tormentis utuntur. Sæpe cum Turcis, et quidem felici Marte belligerant."‡ They were not unacquainted with guns, and had suffered from the Turkish artillery in the time of this king's predecessor, Ismá'il Safí. And Herbert relates that when the Turks under Sulaimán invaded Persia, this same "Tamas, affrighted with their great ordnance, byres 5000 Portugalls from Ormus and Indya, who brought 20 cannon along with them, and by whose helps the Turks were vanquished."§ The Turks were early noted for their attention to gunpowder artillery, and the armament of their forts seems to have been on a par with that which they brought into the field against the Persians and others. At the time when Father Gaspar wrote the above account of the defect of artillery in Persia, a French traveller and naturalist, M. Bellon, says of the fortifications of Sestos, which he saw in 1548, "Validis tormentis bellicis egregie muniti sunt, quæ expellant (si necesse sit) in eas naves quæ sine licentiâ effugere, vel in Helles-

One passage runs somewhat in this fashion. "3 p. m. Riot increases. The military has been called out. He is at present standing opposite our door!"

* *Tárikh-i-Sher Sháhí*. Dowson's *Elliot*, IV, 401.

† *Tárikh-i-Dáúdí*. Dowson's *Elliot*, IV, 499. See also notices of artillery at this

period in the *Tárikh-i-Rashidí*, V, 131, and *Tárikh-i-Alfí*, V, 172.

‡ *Epistolæ Indicæ*, p. 38 (*Ep. M. Gaspari Belgæ*).

§ *Tho. Herbert. Some Yeares Travels*, p. 289.

pontum vi perrumpere vellent."* It was from the Portuguese that Persia had to obtain the assistance of guns. And twenty years before this, the Spaniards were using artillery in Mexico, and cast guns there for themselves.†

When, in the next century, Ormus was taken from the Portuguese by the Persians under Sháh 'Abbás the Great, with English assistance (1627), the armament of the defenders was something considerable, according to Herbert's account of it. "The brass Ordnance in the Castle and Rampires were divided; some say they were three hundred, others as many more: Howbeit, our men say there were only fifty-three great brasse peecees mounted, foure brasse cannon, six brasse demicannon, sixteen cannon pedroes of brasse, and one of iron, 9 culverin of brasse, two demiculverin of brasse, three of iron, ten brasse bases, seven brasse bastels, some basilisks of 22 foot long, and nintie two brasse peecees unmounted; which I the rather name, in that the Portugalls bragge they had small defence, and few Ordnance."‡ At this time guns, both large and small, were in use in Abyssinia, having been introduced by the Turks and Arabs in occupation of various parts of the east coast of Africa.§ On the west coast of India also, at the same time, some skill in the use of artillery had been acquired by people not otherwise highly advanced. "Mallabar", says Herbert, "is subdivided into many Toparchiees, all obeying the Samoreen, a naked Negro, but as proud as Lucifer." "By long warres, they are growne expert and orderly: yea know how to play with Cannons, have as great store of Harquebuzes, and are as well acquainted with the force of powder, as we or any other nation."|| A special ordnance department was instituted in India in Humáyún's time (when, as we have seen, artillery had come to play an important part),¶ preparing the way for the more complete arrangements under Akbar, who paid much attention to this part of his war equipment, and who was, himself, according to Abul Fazl, an improver and inventor of matters connected with this department.**

Persia continued to be backward in its artillery. In 1635, when Herbert was in that country, Sháh Safi, grandson of 'Abbás the Great, being king, the traveller writes, "In a common muster the Persian king can easily advance (as appears by roll and pension) three hundred thousand

* Bellonii Observationes, 186.

† Prescott, Conquest of Mexico, II, 266.

‡ Herbert's Travels, p. 118.

§ Lettera Annua di Ethiopia, Gasparo Paës, 1624.

|| Herbert, 300, 302. This disregard of clothing, by even the king, was in the preceding century (1443) remarked upon by 'Abd-ur-Razzák, author of the *Maftá' us-sa'dáin*, and afterwards by other European travellers. Dowson's Elliot, IV, 101, and Note.

¶ Humáyún-námah. Dowson's Elliot V, 123. Tárikh-i-Rashidi V, 133.

** Blochmann's A'in-i-Akbari, Aín 36, I, p. 112.

horse, and seventy thousand good musquetoons." "Their harquebuz is longer than ours, but thinner and not so good for service. They can use that very well, but detest the trouble of the Cannon, and such field peeces as require carriage."* When Kaempfer was in Persia more than fifty years after (in 1692), they seem to have got no further. "Arma illis sunt lancea, sclopeto, arcus, et acinaces; tormentorum et mortariorum nullus illis in campo usus est."† India was much ahead, as we learn from Bernier's account of Aurangzib's artillery thirty years before this time.‡

After seeing the kind of progress that was being made in India and Persia in the sixteenth and seventeenth centuries, one may be surprised to read, in the papers on the History of the Burma race, compiled by Sir A. Phayre from native sources, published in the J. A. S. B., that in the beginning of the fifteenth century, more than a hundred years before Bábar appeared with his guns on the bank of the Ganges, the king of Pegu, advancing up the Iráwadi against king Meng Khoung, did not dare to land and attack Prome, "as it was defended with cannons and muskets."§ The editor of the Journal has observed that this mention of guns and muskets in Burma in 1404 is rather remarkable. It is, if they were what we understand by cannons and muskets. But it suggests a question. This was a region abounding in petroleum. Is it not possible that these fire-arms may be explained in the same way as Mahmúd's *tóp* and *tufang*? (above, page 41). It is true that a traveller who was in India about that time (Nicolo Conti) says "the natives of central India" (by which he seems to mean a part he had not visited) "make use of balistae and those machines which we call

* P. 232. The objection to field guns is one that can be readily understood, from the similar experience of other countries, above referred to. Of a different kind was the dislike which a traveller in the previous century says the people of North Africa had to the smaller fire-arms. "All the Arabians that live towards the west, where the kingdoms of Fez and Morocco lie, do commonly carry spears about twenty-five hands long. They use no Musquets or Pistols, neither do they love 'em." (*Description of Africa*. From John Leo and Marmol. *Harris's Collection*, I, 311.) Tod says the same of the Rájputs of the same and later times. Writing of A. D. 1535 he says, "The use of artillery was now becoming general, and the Moslems soon perceived the necessity of foot for their protection; but prejudice operated longer upon the Rajpoot, who still curses 'the vile guns' which render of comparatively little value the lance of many a gallant soldier." (*Rajasthan I*, 310.) See a parallel to this idea cited by Colonel Yule, *Marco Polo*, II, 127.

Amœnitates Exoticæ, 75.

‡ Cinquante ou soixante petites piéces de campagne, toutes de bronze; soixante et dix piéces de canon, la plupart de fonte, sans compter deux à trois cens chameaux légers qui portaient chacun une petite piéce de campagne de la grosseur d'un bon double mousquet. *Bernier, Voyages I*, 296.

§ J. A. S. B., Vol. XXXVIII, Part I, 1869, p. 40.

bombardas, also other warlike implements adapted for besieging cities ;”* but this does not appear to receive support from the Indian historians. Tavernier refers to a tradition of the early knowledge of powder and cannon in Pegu, believed to have been obtained from Asám. Writing of the attack at Asám by the “Grand Capitaine *Mirgimola* (Mir Jumlah) under the orders of Aurangzib, in 1652, (to which, the traveller observes, little resistance was expected, the country having enjoyed peace for five or six centuries, and the people having no experience of war), he says, “On tient que c’est ce même peuple qui a trouvé anciennement l’invention de la poudre et du canon, laquelle a passé d’Asem au Pegu et du Pegu à la Chine, ce qui est cause que d’ordinaire on l’attribue aux Chinois.”† We have seen that, in China, the petroleum of some of its western provinces is said to have been used in old time for a kind of Greek Fire.‡ Asám also, it may be observed, is a petroleum country. Perhaps this may confirm, in some measure, the above suggested explanation of the guns and muskets in Burma. Colonel Symes, in his account of the Embassy to Ava in 1795, considers that the Burmese learned the application of gunpowder from Europeans, though the substance may have been known before. “The musket,” he says, “was first introduced into the Pegu and Ava countries by the Portuguese.”§ Now-a-days Ava receives English muskets.|| In the Note on the intercourse of the Burmese countries with Western nations, in Chapter viii of Colonel Yule’s *Narrative of the Mission to the Court of Ava in 1855*, Portuguese muskets in Burma are noticed in the early part of the 16th century. There is no mention of artillery till 1658, when the guns on the ramparts of Ava, directed against the Chinese invaders, were said to have been served by a party of native Christians, under a foreigner who is, with some probability, supposed to have been an Englishman.¶ But the brief notices, in the chapter referred to, of the narratives of old travellers, were not made with a view to any special enquiry on this subject.

To the Chinese has been attributed, in a more or less indefinite way, a very early knowledge of gunpowder artillery. Gleig, in his “*Sketch of the Military History of Great Britain*”, says that “Robert Norton, the author of a treatise called *The Gunner*, which was published in 1664, * * * quotes Uffano, an Italian traveller in the East, as proving that not only gunpowder but cannon were used so early as the year 83 of our era by the

* *India in the 15th Century* by R. H. Major. (*Hakluyt Soc.*) *Travels of Nicolo Conti*, p. 31.

† *Voyages de J. B. Tavernier*, II, 427.

‡ D. F. Porter Smith, on the Oils of Chinese Pharmacy (quoted above).

§ *Embassy to the Kingdom of Ava in 1795*, II, 60.

|| *Yule’s Mission to the Court of Ava in 1855*, p. 75.

¶ *Id.*, p. 215.



Chinese, and that the alarm created by them was one great cause of the defeat at that time of a Tartar invasion."* Few other writers, however, go so far back. The nature of the proof of this early use of cannon is not mentioned. Gibbon says that in China, in the thirteenth century, "in the attack and defence of places the engines of antiquity and the Greek Fire were alternately employed, and the use of gunpowder in cannons and bombs appears as a familiar practice."† But the absence of all mention by Marco Polo of any such practice, while, in his account of the siege of Siang Yang in 1268 by Kublai, he records the manufacture and employment of mangonels and trebuchets, a short experience of which induced the Chinese garrison to surrender,‡ may throw some doubt on the Chinese knowledge of cannon at that time.

The exclusive and self-isolating practice of China through many ages, and the absence of authentic information regarding its early history, occasion possible errors in two opposite directions,—perhaps crediting the people of that country in early times with a state of advancement in arts and knowledge which they had not attained, perhaps again wrongly imagining them to have continued in primitive backwardness down to recent times. "There must have been a series of ages", Sir Henry Maine has observed, with reference to matters of a different kind, "during which this progress of China was very steadily maintained; and doubtless our assumption of the absolute immobility of the Chinese and other societies is in part the expression of our ignorance."§ This is very true; but, on the other hand, this same ignorance sometimes expresses itself in errors of an opposite kind. *Omne ignotum* has, in all ages, been apt to suggest something uncommon or wonderful; and of this kind seems to have been the idea that the Chinese were acquainted, before European nations, with gunpowder and cannon. MM. Reinaud and Favé, who have gone into the matter pretty fully in the work before quoted, thus conclude their statement of the result of the investigation, which leaves little ground for the Chinese claim to stand upon, "Ainsi tombe l'opinion exagérée que s'étaient faite plusieurs savants sur l'art des artifices de guerre chez les Chinois."||

In the Note by Sir Henry Elliot on the Early use of Gunpowder in Ind: he quotes the opinion expressed by General Cunningham in his Essay on the Arian Order of Architecture (*J. A. S. B., Vol. XVII, Sept. 1848, p. 2*) with reference to the condition of the ruins of some of the old

* *Sketch of Mil. Hist. of Great Britain*, p. 100.

† *Decline and Fall*, Ch. LXIV.

‡ *Yule's Marco Polo*, 2nd ed., II, 152.

§ *Lectures on the Early History of Institutions*, p. 227.

|| *Feu Grégeois*, p. 201.

¶ Original Vol. I. Note II, p. 340.

Hindu buildings in Kashmír, particularly those of the temples at Avantipura, that no agency but that of gunpowder could have reduced them to the state of entire destruction and confusion in which the materials of the structures are now found. And this destruction, if it was, as is supposed, the work of Sikandar, designated *But-shikan*, who was reigning at the time of Timur's invasion of India, occurred about the beginning of the fifteenth century. (Otherwise, gunpowder being used, General Cunningham supposes Aurangzib may have been the destroyer.) But other agencies appear sufficient to account for the condition of these buildings. During the interval,—a little more than quarter of a century,—since General Cunningham expressed this opinion, the fingers of Time, and moderate movements of the earth, have been making openings in some of the other old Hindu buildings in Kashmír; and from their appearance it may be believed that these same agencies, together with undermining work applied for wilful destruction, could do what has been done. The little temple of *Páyach*, so complete at the time of General Cunningham's visit on the occasion referred to, has now not only lost the pinnacle he describes,—which is a small matter,—but has its roof-stone, which is a single block, further dislodged than at that time, some of the other stones out of their places, and gaps as wide as two inches in the masonry of the basement, through which can be seen the interior filling of small boulders. At the splendid temple of Martand, the two side buildings which General Cunningham described are now seriously out of the perpendicular, and parts of the lower courses of masonry of the north-east angle of the main building have fallen out, painfully suggesting the probability that, unless measures are taken to re-support it (which it is hoped is now to be done) that corner of the building may ere long come down, and, with it, great part of the walls. If some such work of destruction were done purposely, perhaps suggested by,—partial injury of this kind from natural causes, the ruin might be as complete as that of the buildings at Avantipura. The whole of that country has long been noted for the frequency of earthquakes.* In the present century they have occasionally been severe. The earthquakes of June and July, 1828, which were repeated almost daily for weeks together, caused much destruction of house property in Srínagar, and large masses of rock are said to have been detached from the hill sides and thrown down. Gunpowder does not seem necessary to account for the ruin of these Kashmír temples.

While there appears to be no good evidence in support of the idea that

* "Je croirois," says Bernier, speaking of the legends regarding the opening of the Baramula pass by which the Jhelam issues from the placid level of the valley, "Je croirois plutôt que quelque grand tremblement de terre, comme ces lieux y sont assez sujets, auroit fait ouvrir, &c. &c." (*Voyages*, II, 269.) Abul Fazl notices the frequency of earthquakes in Kashmír. (*Gladwin's Ayeen Akbary*, II, 153).

Asia had a knowledge of gunpowder, and used fire-arms, before Europe, there are plain indications that the knowledge of the most improved weapons of war, both before and since the introduction of gunpowder, and the skill to make and to use them, came from Europe to India and other Asiatic countries.

It has been seen above how Kublai Khán employed *Western* engineers to construct and direct the machines he used in the siege of Siang-yang in 1268. The engines used by Sultán Jalál-ud-dín in his attack of the fort of Rantanbhor, A. D. 1290, are called *maghribíhá*, or *Western* (engines).* In the history of part of the reign of 'Alá-ud-dín Khiljí, from 1296 to 1310 (A. H. 695 to 710), called *Tárikh-i-'Alái*, the author, to illustrate the great strength of the fort of Arangal, says, "if a ball from a western catapult were to strike against it, it would rebound like a nut."† Again, on one face of the fort, it is said the "western engines" succeeded in making several breaches.‡ The account of the same transaction given by Zia-ud-dín uses this same term *maghribí* for the *manjaníks* used on both sides.§

This indefinite term *Western*, as applied to the mechanical war engines of those days, is narrowed to *Firingíhá* as the designation of gunpowder artillery in Bábar's time. This is the term used in this account of the battle of Pánipat, April, 1526.|| Colonel Tod, in his account of the attack by Bahádur, Sultán of Gujarát, on the fort of Chitor, defended by Ráná Bika-májít, A. D. 1535, (S. 1591) says, "This was the most powerful effort hitherto made by the Sultans of Central India, and European artillerymen are recorded in these annals as brought to the subjugation of Cheetore. The engineer is styled '*Labri Khan, of Frengán*', and to his skill Bahadur was indebted for the successful storm which ensued."¶ It would appear that the employment of Europeans in a similar capacity at a much earlier period with the mechanical war engines is what is meant, in certain old narratives referred to by the same author, though their employment is not distinctly mentioned. He quotes from the "*Sooraj Prakás*" an account of the preparations of the king of Kanauj for opposing an invasion from beyond the Indus, in the 12th century, when "the king of Gor and Irak crossed the Attok", in which it is said that the invading army had

* *Tárikh-i-Firúz-Sháhi, of Zia-ud-dín Barni, Dowson's Elliot, III, 146.*

† *Tárikh-i-'Alái. Dowson, III, 80.*

‡ *Id., III, 82.*

§ *Tárikh-i-Firúz-Sháhi (Zia-ud-dín). Id. II, 202.*

|| *Erskine and Leyden's Memoirs of Baber, 306. Tuzak-i-Bábari, Dowson, IV, 255.*

¶ *Tod's Annals of Rajasthan, I, 310.*

the aid of "the skilful Frank, learned in all the arts."* In a footnote Tod adds, "It is singular that Chand likewise mentions the Frank as being in the army of Shabudin in the conquest of his sovereign Pirthiraj."

The note in Erskine and Leyden's translation of Bábar's Memoirs, on the passage above referred to, about artillery at the battle of Pánipat, says of the term '*Feringiha*', "the word is now used in the Dekkan for a swivel."† I am informed by Mr. Shaw, lately our representative in Yárkand, that in a book which he obtained during his residence in Turkistán, relating to events in Yárkand in the beginning of last century, guns are designated *Firingi miltik*. (*Miltik* is the word given for *musket*, in the Vocabulary appended to Sir D. Forsyth's Report of the Mission to Yárkand in 1873.‡ It is perhaps used in a more general way also for fire-arms, like our *gun*.) The same term, *Firingi Miltik*, Mr. Shaw mentions, is now applied to Rifles. It may be inferred that it was for a similar reason that in the other instances above referred to, in earlier times, corresponding terms were used with reference to the engines and engineers, and then to the first gunpowder artillery used in India.

Alike in Asia and in Europe the earlier weapons of war continued, of necessity, to be used long after the introduction of gunpowder artillery, and along with it. The guns, few in number, were at first merely a small but startling addition to the ordinary implements of battle. At Pánipat, when Bábar's *Firingi* field-pieces were causing a new sensation, the smaller fire-arms were not yet in use, and throughout the account of the fight he relates how his troops poured in discharges of arrows on the enemy. When the Zamorin's subjects had become familiar with powder and modern fire-arms, as noticed above, still "in all fights", as Herbert goes on to say, "they also use bow and arrow, darts and targets, granads and variety of fire-works."§ So of course did English bows, long after Creci, play the chief part in fights in which cannons also were brought into play.||

In Europe the fire missiles of the earlier days were both used along with modern guns and discharged by means of them. And the Greek Fire, having its composition and effects modified by gunpowder led the way to the later *balles ardentes* or *pots de feu*, and shells. Fire arrows even were among the kinds of missiles thrown from the early small-bore guns.¶

* Tod's Rajasthan, II, 8.

† P. 306. Also Dawson's Elliot, IV, 255.

‡ P. 548.

§ Some Yeares Travels, p. 302.

|| Mr. Grant Duff, in his Notes of his recent journey in India, mentions that an officer who accompanied him on his visit to the fort of Láhor (Jan. 1st, 1875) informed him he had had an arrow shot at him during the siege of Multán in 1848. (Contemp. Rev., July 1875.)

¶ Nap. Louis Bonaparte. Etudes sur le passé et l'avenir de l'Artillerie, p. 43.

Froissart mentions Greek Fire used with modern artillery by the English at the siege of the castle of Romorantin in 1356. "Si ordonnèrent à apporter canons avant et à traire carreaux et feu grégeois dedans la basse cour." "Adonc fut le feu apporté avant, et trait par bombardes et par canons en la basse cour."* In their contests with the Moors in Granada, in 1485, the Spaniards threw from their engines large globular masses composed of certain inflammable ingredients mixed with gunpowder, which, "scattering long trains of light", caused much dismay.† The earlier cannon, M. Viollet le Duc says, in his work on the Military Architecture of the Middle Ages, "appear to have been often used, not only for hurling round stones as bombs, like the engines which worked by counterpoise, but likewise for throwing small barrels containing an inflammable and detonating composition such as the Greek Fire described by Joinville, and known to the Arabs from the twelfth century."‡ This application of Greek Fire, or some of these other compositions, is the device which the experienced campaigner, Rittmaster Dugald Dalgetty, brought to the notice of Sir Duncan Campbell of Ardenvohr—"Still however the Captain insisted, notwithstanding the triumphant air with which Sir Duncan pointed out his defences, that a sconce should be erected on Drumsnab, the round eminence to the east of the castle, in respect the house might be annoyed from thence by burning bullets full of fire, shot out of cannon, according to the curious invention of Stephen Bathian, king of Poland, whereby that Prince utterly ruined the great Muscovite city of Moscow. This invention, Captain Dalgetty owned, he had not yet witnessed, but observed that it would give him particular delectation to witness the same put to the proof against Ardenvohr, or any other castle of similar strength; observing that so curious an experiment could not but afford the greatest delight to all admirers of the military art."§ The event which the Captain referred to belongs to the latter half of the sixteenth century. In 1582, this Stephen Bathian or Bathony, king of Poland, made peace with Russia under Ivan II.

We are generally accustomed, now-a-days, to look upon the practical application of any kind of Greek Fire to hostile or incendiary purposes as a thing of the past and only of historical interest. But the extraordinary abundance of the petroleum with which the world is now supplied has fur-

* Froissart, I, 2, 26, quoted by Reinaud and Favé, 223; and Lalanne, *Feu Grégeois*, 61.

† Prescott, *Ferdinand and Isabella*, I, 277. The Catalogue of Arabic Military Works before referred to speaks of the use of cotton dipped in oil, with *daqq-al-harrâqat*, which may mean fire-powder; the burning power of fire arrows being strengthened by the addition of some gunpowder composition of the earlier kind used for fire-works. *Fihrist* &c., p. 64.

‡ Translation by M. Macdermott, p. 170.

§ Legend of Montrose, Chap. X.



nished the means, as well as suggested the idea, of its use for this purpose. With all the resources of modern skill and appliances, Greek Fire was brought into use at the siege of Charleston in 1863,—not without some expressions of public disapproval.* The secret manufacture of Greek Fire in Dublin, for Fenian use, in 1867 received a check by the arrest of the artist. It is not forgotten how burning petroleum was brought into use, in a not very edifying manner, by the communists in Paris in 1870; and since that time by more than one party in Spain.

The occasional revivals of disused weapons and practices of war make but little mark on the line of continuous progress in the art of preparing war fire material. It is likely that the advances from one kind of fire weapon and fire composition to another have all been gradual, and that to no definite time or single individual can be attributed the invention or discovery of either Greek Fire or gunpowder. The usual account of Greek Fire, which implies that it was one distinct and specific composition, is that it was invented by Callinicus, an architect of Heliopolis (Ba'lbek), who deserted from the service of the Caliph to that of the Emperor Constantine *Pogonatus* (the bearded) in the latter half of the seventh century, that its composition was a secret, and the art was preserved at Constantinople, that the secret afterwards passed in some way to the Muhammadans, that the use of the Greek, or, as it may now be called, says Gibbon, the Saracen fire was continued to the time of the invention or discovery of gunpowder, and that the secret has since been lost.† Grose adds another supposition, that it was the invention of Arabian chymists, and the researches made since his time show this to be at least equally likely.

The various preparations for which receipts are given in the Arabic books quoted by MM. Reinaud and Favé have probably all been recognised as forms of the fire compositions which, under whatever name at the time, caused much terror to those against whom they were used, and were afterwards known by the common name of Greek Fire; though the fire so called which was most alarming and destructive was liquid, that is, apparently,

* A feeling which had been strongly expressed in a less advanced age. MM. Reinaud and Favé quote from a manuscript treatise on the Art of War by Christian of Pisa, in the reign of Charles VI, of France (beginning of the fifteenth century), "Mais comme telles choses à faire ne enseigner pour les maux qui s'en pourroient ensuivre soient deffendues et excommuniées, n'est bon d'en mettre en livres ne plus plainement en réciter, pour ce qu'à crestien n'appartient user de telles inhumanités qui nécessairement sont contre tout droit de guerre." On which the modern authors observe—"Remarquons que l'auteur ne parle pas du feu grec comme d'une chose inconnue, mais comme d'un moyen de guerre déloyal." *Feu Grégeois*, p. 220.

† Gibbon, *A. D.* 668—675.

Beckmann's Hist. of Inventions and Discoveries, IV, 84.

Grose's Military Antiquities, II, 309.

was prepared with petroleum. It was not one single mixture compounded after the prescription of Callinicus. Nor does there appear to have been any secret in the matter, nor does the art appear to have been at any time lost.* Only all people had not command of the most essential materials of the composition, and in particular, of the petroleum or naphtha, which is frequently named as the chief or only combustible thus used.†

With still less certainty can the invention or discovery of gunpowder be assigned to any particular time or person. When it is claimed for Roger Bacon or Berthold Schwartz, it comes to little more than this, that they were attentive students of the chemistry of their time and acquainted with compositions of the nature of gunpowder, and that they recorded what they knew and had seen. It was, however, apparently without knowing or noting the capabilities of gunpowder for application to military purposes.‡ From the various combinations of the ingredients for use in fire-works, the advance was great which resulted in the application of the compound to explosive and projectile purposes, and its preparation in a form suitable for those uses. The discovery of its expansive power would, it might be sup-

* See Reinaud and Favé, Chap. VIII, p. 219, &c.

† A question arises whether a mistake is not made in the use of the term *Greek Fire*; not merely the question suggested by its uncertain history, whether or not it was in any sense of Greek origin, but whether the word "Greek" is the right representation of the term from which it is taken. Is the term "*Greek Fire*" or any exact equivalent, used before the time of the Crusade Chronicles in which it appears in the form *Feu Grégeois*? And are the names since used, *Ignis Græcus*, *Greek Fire*, &c., taken from this? Then what is *Grégeois*? The word is almost, if not entirely, limited to this particular application of it. The Dictionary of the French Academy says "*Grégeois*. Il n'est usité que dans cette locution, *feu grégeois*, espèce d'artifice dont on se servait anciennement à la guerre," &c. It is not used as a synonym of *Grec*. Can it be connected with any other word? The old French verb *grégier* is thus interpreted in the *Complément* of the French Academy's Dictionary. "*Grégier*, v. a. et n. (V. lang.), Gré-ver, Accabler, Faire tort." And *gréver* is from *gravis*; (*gréve* = *grief*). (*Diez, Etymological Dictionary of the Romance Languages*, by T. C. Donkin.) A derivation of *grégeois* from *grégier* does not appear impossible or fanciful. May it not have been a descriptive epithet of the fire, *grievous* or *terrible*? Just as in China the material is said to have been known in the tenth century by the name of "oil of the cruel fire." (*Grose, II*, 309). The suggestion is perhaps not worth much. But the title of the fire to the name *Greek* does not appear clear.

‡ Not that this would have been set aside as being of no concern to men of their profession. Sir Walter Scott's picture of an energetic monk, technically familiar with the construction and working of the mechanical war engines of his time, while professing that they did not come within the range of his studies, (*The Betrothed*, Chap. VIII) is probably not a mere personal portrait. Inmates of monasteries, as well as other ecclesiastics, of the Middle Ages, while they were the conservators of learning, and the cultivators of the ornamental arts, did not neglect to keep an eye on the arts that pertained to war.



posed, be readily followed by the invention of cannon. Yet though this property of gunpowder was known to Roger Bacon, no form of instrument for applying it to the purpose of propelling missiles of any kind seems to have been known till long after. And the invention of cannon does not appear to be assignable now, any more than that of gunpowder, to any particular individual.*

The compositions above referred to, for which the Arabs had receipts in times preceding the knowledge of gunpowder artillery in Europe, appear distinctly to have been applied as combustibles,—in fire-works and fiery missiles. They were forms of fire-powder, not gunpowder. And they may have been the first to make them. Colonel Favé, in his *Etudes sur le passé et l'avenir de l'Artillerie*, goes further, however, and says "Les Arabes paraissent avoir été les premiers à lancer les projectiles par la force explosive de la poudre à canon."† It may be so, but there does not appear to be good evidence of it. They led the way to gunpowder, through Greek Fire and fire-works, and made it, but did not apparently find out, before European nations, its most important form and application.

It has been noticed that the use of modern artillery made very unequal progress in different countries. The use of gunpowder, like that of Greek Fire, was, in its early days, largely dependent on the facilities for procuring the materials and manufacturing the powder, or on the facilities for obtaining the powder ready-made from other countries. With communications imperfect and tedious, supplies of gunpowder would be uncertain. An Eastern traveller in the beginning of the seventeenth century says that at that time a place in the neighbourhood of Aehin "supplies in a manner all the Indies with sulphur to make powder of."‡ This was rather a wide general statement. In Scotland, a few years after the time of which this traveller writes, it is recorded, under date July 19th, 1626, that "amongst the preparations for war at this time, the Privy Council, reflecting on the inconveniences of being wholly dependent on foreign countries for gunpowder, empowered Sir James Baillie of Lochend, Knight, to see if he could induce some Englishmen to come and settle in Scotland for the manufacture of that article."

* History says nothing in support of the pretensions of Butler's claimant "Maggano, great in martial fame",

Of warlike engines he was author,
Devised for quick dispatch of slaughter.
The cannon, blunderbus, and saker,
He was th' inventor of, and maker.

Hudibras, Part I, Cant. 2.

† Quoted in *Quarterly Review*, July 1868. Art. IV. "Gunpowder."

‡ *M. Beaulieu's Voyage to the East Indies, A. D. 1619. Harris's Collection* 250.

The arts pertaining to weapons and munitions of war spread now over a wide field. In the line on which they were started by the introduction of gunpowder they have made great advances in the hands of different nations of Europe. With no essential change, of the kind which took place when gunpowder artillery came into use, the minute improvements in execution, and careful attention to accuracy, in modern times, and particularly in the present century, have made changes nearly as important. Great as the difference between the old and the new war engines, in the days when they worked together, as great probably are the differences of another kind between Bábar's *firingi* field-pieces at Pánípat and the Armstrongs of the present day.

*Were the Sundarbans inhabited in ancient times?—By H. BEVERIDGE,
B. C. S.*

This is a question which has excited a great deal of attention. The Bengali mind as being prone to the marvellous and to the exaltation of the past at the expense of the present, has answered the question in the affirmative and maintained the view that there were formerly large cities in the Sundarbans. Some Bengalis also have suggested that the present desolate condition of the Sundarbans is due to subsidence of the last, and that this may have been contemporaneous with the formation of the submarine hollow known as the "Swatch of no ground". It seems to me, however, to be very doubtful indeed that the Sundarbans were ever largely peopled, and still more so that their inhabitants lived in cities or were otherwise civilized. As regards the eastern half of the Sundarbans, namely, that which lies in the districts of Bákirganj and Noákhálí and includes Sondíp and the other islands in the estuary of the Megna, it seems to me that the fact of so much salt having been manufactured there in old times militates against the view of extensive cultivation; for the salt could not have been made without a great expenditure of fuel, which of course implies the existence of large tracts of jungle. Du Jarric speaks of Sondíp as being able to supply the whole of Bengal with salt, and it seems evident that in old times salt was reckoned as the most valuable production of this part of the country. How inimical this must have been to a widespread cultivation of the neighbouring tracts may be judged of from the fact that in modern times the salt manufacture by Government was a great obstacle to the clearing and colonization of the churs and islands, as the Government officers insisted on the jungles being maintained for salt-manufacture. The zamíndárs also of Dakhin Shahbázipur obtained, as I have elsewhere stated, a large reduction of their land revenue on account of part of their lands being taken up for the use of the salt works.

Sondip itself was, it is true, cultivated in Cæsar Frederick's time (1569), but so it is now, and there is no reason to suppose that its civilization was greater then than it is at present. It may have, but then it certainly had, some thirty or forty years later, one or two Forts, which were marks of insecurity rather than of prosperity, and which do not exist now, simply because the Aracanese and the Portuguese pirates are no longer formidable. Ralph Fitch visited Bacola in 1586, and describes the country as being very great and fruitful. He does not, however, expressly say that Bacola was a city, and it is possible that the people lived then as now in detached houses, and did not lodge together in any great town or mart. But even if we take the words "the houses be very fair and high builded, the streets large" (a most unlikely thing in any oriental city) to mean that there was a city of Bacola and give full credence to Fitch's statements, the next clause of the description, *viz.*, "the people naked, except a little cloth about their waist" does not suggest the existence of much civilization or refinement.

Moreover, there is nothing to show that Bacola was in what are now known as the Sundarbans. It probably was the same as Kochúá, which, according to tradition, was the old seat of the Chandradíp Rájás. But Kochúá is at this day one of the most fertile and best cultivated parts of Bákirganj, and is the only place in the south of the district which contains a large Hindu population. No doubt there has been a great amount of diluviation near Kochúá, and the river between the mainland and Dakhin Shahbázipur has become much wider than it was in old times. In this way the old city of Bakla and much of its territory may have disappeared, and to this extent there probably has been a decay of civilization, but this is a different thing from the supposition that the tract now existing as forest was formerly inhabited by a civilized people. It seems to me also that Fitch cannot have been a very observant traveller, as otherwise he would have noticed the terrible storm which overwhelmed Bakla only a year or two before his visit, and that therefore we should not press his statement too far. Possibly all physical traces of the storm had disappeared, but surely people must still have been telling of it, and Fitch must have heard of it if he stayed at Bakla any time or had any intercourse with the inhabitants.

Another thing which indisposes me to believe in the early colonization of the eastern part of the Sundarbans is the terrible hardships which the crew of the "Ter Schelling" suffered on this coast in 1661. The "Ter Schelling" was a Dutch vessel which sailed from Batavia for Ongueli (Hijli) in Bengala on 3rd September, 1661, and was wrecked off the coast of Bengal in the first half of the following month. The narrative of the voyage and shipwreck, and of the subsequent adventures of the passengers and crew was written by one of them. The author was, I believe, a

1876.] H. Beveridge—*Were the Sundarbans inhabited in ancient times?* 73

Dutchman, and his account was first published at Amsterdam and afterwards at London in 1682 under the title of 'Relation of an unfortunate voyage to the kingdom of Bengala'. The passengers and crew seem to have landed on an island near Sondip, and their sufferings from hunger were most terrible. They were compelled to live on most disgusting objects such as a putrid buffalo, a dead tortoise, "leganes", serpents, snails, and the leaves of trees, and to drink salt water. They saw very few inhabitants, and those whom they did come across seemed to be almost as poor and miserable as themselves and to have been driven out from more civilized regions. They were several times on the eve of resorting to cannibalism, but eventually they got to Sondip, where they were kindly treated and sent on to Bulwa (Bhaluá). The prince of Bulwa was also kind to them, and sent them on to Decke (Dháká), where they were impressed and made to serve in the war under Mír Jumlah against Asám. Unfortunately the author does not clearly indicate the site of the shipwreck, but it was evidently somewhere on the sea coast of the Sundarbans. The people whom he met, or at least some of them, appear to have been Muhammadans, for they used the expression 'salaam'.

In Professor Blochmann's Contributions to the Geography of Bengal, No. I. (J. A. S. B., 1873, Pt. I., p. 227), reference is made to Van den Broucke's map in Valentyn's work as showing the place where the "Ter Schelling" was wrecked.

I may also notice here that the copper-plate inscription found at Idilpur in Bákirganj, and described in the Asiatic Society's Journal for 1838, seems to imply that the inhabitants of that part of the country belonged to a degraded tribe called the Chandabhandas—a fact which is not favourable to the supposition of an early civilization of the Sundarbans.*

By far the most interesting account of the Sundarbans is contained in the letters of the Jesuit priests who visited Bakla and Jessore in 1599 and 1600. Their letters were published by Nicolas Pimenta and have been translated into Latin and French. I was indebted for my introduction to them to my friend Dr. Wise, who told me that they were quoted in Purchas's Pilgrimage. Extracts from the letters and the subsequent history of the mission are also given by Pierre Du Jarrie in his 'Histoire des choses plus mémorables advenues aux Indes Orientales', Bordeaux, 1608-14.

It appears that Pimenta, who was a Jesuit visitor and stationed at Goa, sent two priests, Fernandez and Josa, to Bengal in 1598. They left Cochin on 3rd May, 1598, and arrived in eighteen days at the Little Port (Porto Pequino). From thence they went up the river to Gullo or Goli,

* Vide, however, Mr. Westmacott's remarks on this name, J. A. S. B., 1875, Pt. I, p. 6.

where they arrived eight days after leaving the 'Little Port'. While at Gullo, they were invited by the Rájá of a place, called Chandecan (in Italian Ciandecan), to pay him a visit, and accordingly Fernandez sent Josa there, and he was favourably received by the king. One year after these two priests had left Cochín, Pimenta sent two other priests, namely, Melchin de Fonseca and Andrew Bowes, to Bengal, and they arrived at Chittagong or at Dianga some time in 1599. On 22nd December, 1599, Fernandez wrote from Srípur, giving an account to Pimenta of the success of the mission, and on the 20th January, 1600, Fonseca wrote from Chandecan, giving an account of a journey which he had made from Dianga to Chandecan by way of Bakla. Fonseca's letter is most interesting. He describes how he came to Bacola, and how well the king received him, and how he gave him letters patent, authorising him to establish churches, &c., throughout his dominions. He says that the king of Bakla was not above eight years of age, but that he had a discretion surpassing his years. The king "after compliments asked me where I was bound for, and I replied that I was going to the king of Ciandecan, *who is to be the father-in-law of your Highness*. These last words seem to me to be very important, for the king of Ciandecan was, as I shall afterwards show, no other than the famous Pratápāditya of Jessore, and therefore this boy-king of Bakla must have been Rámchandra Rái, who we know married Pratápāditya's daughter. Fonseca then proceeds to describe the route from Bakla to Chandecan and I shall give this in the original Italian.

Il viaggio di Bacolá sin a Ciandecan è il piu fresco, delizioso ch'io mai vedessi, per i varii fiumi con alberi alle rive ch' irrigano il paese, e per vedersi da una parte correre numerose schiave di cervi, per l'altra pascere moltitudine di vacche; lascio le campagne spatiose di viso, e li molti canneti di canne mele, gli sciami d'api per gli alberi, e le simi andar saltando da uno albero all' altro e altri particolarita di grande ricreatione a viandanti. Non mancono però Tigri e Crocodili che si pascono di carne humana, per trascuragine, e peri peccoti d' alcuni. Sono ancora per quelle selve Rinoceroti ma io non ne ho visto veruno."

Now though the good father evidently had an eye for natural scenery and was delighted with the woods and rivers, it is evident that what he admired so much must have appeared to many to be "horrid jungle", and was very like what the Sundarbans now are. In fact, a great part of this description of the route from Bakla to Ciandecan is still applicable to the journey from Barisál to Káliganj, near which Pratápāditya's capital was situated. The chief difference is, that the progress of civilization has driven away the herds of deer and the monkeys from the ordinary routes, though they are still to be found in the woods, and the deer have given their name to one of the largest of the Sundarban rivers (the Haringhátá). The

1876.] H. Beveridge—*Were the Sundarbans inhabited in ancient times?* 75

faithfulness of Fonseca's description seems indicated by his modestly admitting that he had never seen a rhinoceros, while stating (quite truly) that there were such animals in the forest. Had he come upon any town on his route, it is reasonable to suppose that he would have mentioned it. Fonseca arrived at Ciandecan on the 20th November, and then he found Fernandez's companion Dominic de Josa, who must either have been left there by Fernandez in 1598, or had returned some time afterwards. The king received Fonseca with great kindness—so much so, that he says he does not think a Christian prince could have behaved better. A church was built at Ciandecan, and this was the first ever erected in Bengal and was as such dedicated to Jesus Christ. Chittagong was the second, and then came the church at Bandel, which was erected by a Portuguese named Villalobos.

The fair prospects of the mission as described by Fernandez and Fonseca were soon overclouded. Fernandez died in November 1602 in prison at Chittagong, after he had been shamefully ill-used and deprived of the sight of an eye; the king of Ciandecan proved a traitor, and killed Carvalho the Portuguese Commander, and drove out the Jesuit priests. Leaving these matters, however, for the present, let us first answer the question, Where was Ciandecan? I reply that it is identical with Pratápaditya's capital of Dhúmghát, and that it was situated in the 24-Parganahs and near the modern Káliganj. My reasons for this view are first that Chandecan or Ciandecan is evidently the same as Chánd Khán, and we know from the history of Rájá Pratápaditya by Rám Rám Bosu (modernised by Harish Tarkalankar) that this was the old name of the property in the Sundarbans, which Pratápaditya's father Vikramádivya got from king Dáúd. Chánd Khán, we are told, had died without heirs, and so Vikramádivya got the property. And there is nothing in this contradictory to the fact that Jessore formerly belonged to Khánja 'Alí [Khán Jahán]; for Khánja 'Alí died in 1459, or about 120 years before Vikramádivya came to Jessore, so that the latter must have succeeded to some descendant of Khánja 'Alí, and he may very well have borne the name of Chánd Khán. When the Jesuit priests visited Ciandecan, Pratápaditya cannot have been very long on the throne, and therefore the old name of the locality (Chánd Khán) may still have clung to it.

But besides this, Du Jarrie tells us that after Fernandez had been killed at Chittagong in 1602, the Jesuit priests went to Sondíp, but they soon left it and went with Carvalho the Portuguese Commander to Ciandecan. The king of Ciandecan promised to befriend them, but in fact he was determined to kill Carvalho, and thereby make friends with the king of Arakan, who was then very powerful, and had already taken possession of the kingdom of Bakla. The king therefore sent for Carvalho to "*Jasor*", and there had him murdered. The news reached Ciandecan, says Du Jarrie,

at midnight, and this perhaps may give us some idea of the distance of the two places.

I do not think that I need add anything to these remarks except that I had omitted to mention that Fernandez visited Ciandecan in October, 1599, and got letters patent from the king. As an additional precaution, Fernandez obtained permission from the king to have these letters also signed by the king's son, who was then a boy of twelve years of age. The boy may have been Udayaditya, and so he must have been only three or four years older than Rámchandra Rái of Bakla.

I must not omit to point out that the fact that Vikramáditya chose Jessore as a safe retreat as the strongest possible evidence of the jungly nature of the surrounding country. It is true it had been cultivated in the previous century by Khánja 'Alí, but the experiment had proved a failure, and the land had in the time of his successor (?) Chánd Khán relapsed into jungle.

To sum up, it seems to me that the Sundarbans have never been in a more flourishing condition than they are in at present. I believe that large parts of Bákirganj and Jessore were at one time cultivated, that they relapsed into jungle, and that they have soon been cleared again, and I have also no doubt that the courts of the kings of Bakla and of Ciandecan imparted some degree of splendour to the surrounding country. But I do not believe that the gloomy Sundarbans on the surface of Jessore and Bákirganj were ever well peopled or the sites of cities.



On Human Sacrifices in Ancient India.—By RÁJENDRALÁLA MITRA, LL. D.

Nothing can be more abhorrent to modern civilization than the idea of slaughtering human victims for the propitiation of the great Father of the universe; yet, looking to the character of the different systems of religion which governed the conscience of man in primitive times, it would by no means be unreasonable to assume *à priori* that such an idea should have been pretty common, if not universal.

The tendency to assign human attributes to the Divinity was a marked peculiarity in almost all systems of religion that then got into currency. The ideal of God was derived from the concrete man. The attributes were doubtless magnified manifold, but their character remained the same—they differed only in degree, but not in kind. A being of unlimited power, of profound erudition, of great subtlety, was what the untutored finite mind of man could conceive in its aspirations to grasp the infinite; and as those aspi-

rations were inspired by a dread of some, to it, unknown force which brings on misfortune, the human susceptibilities of being vexed at disobedience and appeased by flattery and peace-offering, were early attributed to him. In fact a cruel, fierce, vindictive being, whose grace could be purchased by coaxing and presents, was one of the earliest conceptions of the Godhead among primitive races. With the advancement of civilization this conception was materially and greatly purified and improved, but the idea of winning the good-will of an offended, or indifferently disposed, being of great power could not be shaken off, and the coaxing and the presents had, therefore, to be retained under some shape or other. All mantras, charms, and prayers—all offerings, oblations and sacrifices—in fact, the whole history of religion, may be looked upon as the gradual development of this cardinal idea. And inasmuch as the efficacy of an offering, in the case of man, is dependant upon its nearness of relation and preciousness to the offerer, and in primitive times the prime of the flock was the most valued article of possession, sacrifices of animals naturally obtained the highest place in the cultus of ancient worshippers. The owner of the flock was, of course, the nearest and most precious to himself, and his children, the next after him, and accordingly they would be deemed the most appropriate to be offered as sacrifices; though, generally speaking, the main object of worship, in early times, having been the temporal good of the worshipper, it was by no means convenient for him to offer himself as a sacrifice for it. Children, particularly when there happened to be several in a family, could be more readily spared, and they would accordingly be more frequently given up for the purpose.

Again, working out, with reference to the Divinity, the human practice of professing submission by putting oneself into privations and degradation in the presence of the person whose good-will has to be secured, penance and mortification early formed a part of religion, and indeed have been co-extensive with religion itself; and the conclusion was soon arrived at, that if the mortification of the flesh was gratifying to the Divinity, its entire dedication to Him would be much more so. But self-love here intervened, and suggested the idea of substitutes or vicarious sacrifice, which has exercised so potent an influence in the evolution of the religious cultus everywhere.

Further, rejoicings after success in warfare formed a most important element in the annals of primitive society, and as such successes were universally acknowledged to be due to divine interference, the idea of offering to the intervener the fruits thereof was but natural, and the offering of prisoners-of-war as sacrifices was the obvious conclusion arrived at. The extreme difficulty of keeping in security and feeding large bodies of prisoners-of-war has often suggested the necessity of summarily disposing of them by slaughter,—even Napoleon I., it is said, once felt compelled to resort to the odious method of poisoning some of his sick comrades whom he could

not carry away in his march from Jaffa,*—and in ancient times, with no secure prisons and defective commissariat arrangements, when the victors themselves had to depend upon chance for their own rations, it must have been but too frequently felt; and two massacres under such compulsion would suffice to give them a religious character, and render them sacred.

The capital punishment of criminals at stated times would also assume a similar character in a short period. Vindictiveness has, likewise, had a share as much in suggesting human sacrifices as in bringing anthropophagism into vogue.

Moreover, it being admitted that a fierce, sanguinary divinity, who helped his worshippers in achieving success in warfare, would delight in receiving sanguinary offerings, vows and promises to make them on the result of a projected, or impending, battle proving favourable, or on the attainment of some coveted object, would naturally follow; and the simple-minded people who made such vows and promises would not fail to keep them with punctilious care.

Moreover, the practice, so common in pre-historic and proto-historic times (and not altogether a thing of the past in the present day), of showing respect or affection to chiefs and seniors at their funerals by slaughtering, and sometimes, but rarely, burying alive some of their wives, concubines, and slaves, as also their horses and dogs, to accompany them, and to minister to their comfort in another world, was, by its frequent repetition on so solemn an occasion as a funeral, just what would give a religious character to such slaughter, and convert it into a holy sacrifice.

Yet again, the art of the magician, which in primitive times included that of the sorcerer and the soothsayer, had to resort to the most outlandish, uncouth, and extraordinary means to retain its hold on the minds of ignorant, credulous, and superstitious people, and what could be more mysterious and awe-inspiring than communion with the dead and the slaughter of human beings under the most harrowing circumstances? and that such slaughter under the peculiar state of ancient society would be associated with religion was but natural.

Lastly, a vitiated desire for human flesh as an article of choice food was, it would seem, pretty prevalent in rude primitive barbarous times, but as this desire could not be satisfied except at uncertain times when strangers or prisoners were available, the indulgence in it necessarily partook of the character of a feast, and that again soon passed into a religious observance.

* Dr. Desgentiles, in his *Histoire Médicale de l'Armée d'Orient*, denies this charge, but Napoleon himself says, "I was obliged to leave behind all who could not follow us. There were fifty men sick of the plague who could not move with the army, and who must be left to the ferocious Djazzar. I caused opium to be administered to them to release them from their suffering." (Jomini, I, p. 231.) The charge was at the time generally believed.

Thus anthropopathy resulting in devotion, penance, rejoicings, vows and a desire to avert evil, or secure a coveted object by divine intervention, vindictiveness, expediency, respect for the dead, necromancy and depraved appetite, would all tend to human sacrifices; and that they did so, is abundantly evident from the history of human civilization in ancient times. To quote, however, a few instances by way of proofs, though many of them must be familiar to most of my readers.

The Phœnicians frequently offered human victims to their sanguinary gods Ba'al and Moloch to appease their thirst for blood. The Carthaginians did the same to the same divinities. The Druids, both in Great Britain and Scandinavia, likewise, satisfied the spirit of their gods by human sacrifices, often burning large numbers of men in wicker baskets. The Scythians testified their devotion by immolating hundreds at a time. In the Thargalia of the Athenians, a man and a woman were annually sacrificed to expiate the sins of the nation. Homer mentions that twelve Trojan captives were killed at the funeral of Patroclus,* and Menelaus was seized by the Egyptians for sacrificing young children with the Greek notion of appeasing the winds.† As an act of vindictive devotion, Augustus immolated three hundred citizens of Perusia before his deified uncle Divus Julius. The cruel practice of the Cyclops feasting on their prisoners-of-war is well known. According to Euripides, "the most agreeable repast to the Cyclops was the flesh of strangers,"‡ and Homer describes that six of the comrades of Ulysses were devoured by Scylla in the cavern of the Cyclops.§ One passage on the subject gives a vivid picture of the cruel practice, and I quote Pope's version of it entire.

"He answered with his deed; his bloody hand
Snatched two unhappy of my martial band,
And dashed like dogs against the rocky floor.
The pavement swims with brains and mingled gore.
Torn limb from limb, he spreads the horrid feast,
And fierce devours it like a mountain beast.
He sucks the marrow, and the blood he drains;
Nor entrails, flesh, nor solid bone remains.
We see the death, from which we cannot move,
And humbled groan beneath the hand of Jove." *Od. L. I., v. 282.*

Doubtless there is much poetical embellishment in this extract, but divested of it it shows that the Cyclops indulged in human sacrifice. The cavern evidently was, like many others on the shores of the Mediterranean Sea, temples where the horrid rite of anthropothusia was regularly observed,

* *Il. XI. 33.*

† *Herodot., II. 119.*

‡ *Euripides, Cyclops, V. 126.*

§ *Bryant's Ancient Mythology, II., pp. 15 ff.*

80 Rájendralála Mitra—*On Human Sacrifices in Ancient India*. [No. 1,
and shipwrecked mariners were the persons who afforded the readiest victims.

The Lamiae and the Lestrygons were equally cruel in their religious observances. Adverting to the former, Bryant says, "The Lamiae were not only to be found in Italy, and Sicily, but Greece, Pontus, and Libya. And however widely they may have been separated, they are still represented in the same unfavourable light. Euripides says that their very name was detestable. Philostratus speaks of their bestial appetite, and unnatural gluttony. And Aristotle alludes to practices still more shocking: as if they tore open the bodies big with child, that they might get at the infant to devour it. I speak, says he, of people, who have brutal appetites.*

These descriptions are perhaps carried to a great excess; yet the history was founded on truth: and shews plainly what fearful impressions were left upon the minds of men from the barbarity of the first ages.

"One of the principal places in Italy, where the Lamiae seated themselves, was about Formiae; of which Horace takes notice in his Ode to Ælius Lamia.

Æli, vetusto nobilis ab Lamo, &c.
Auctore ab illo ducis originem,
Qui Formiarum mœnia dicitur
Princeps, et innantem Mariæ
Littoribus tenuisse Lirim.

"The chief temple of the Formians was upon the sea-coast at Caiete. It is said to have had its name from a woman who died here: and whom some make the nurse of Æneas, others of Ascanius, others still of Creusa.† The truth is this: it stood near a cavern, sacred to the god Ait, called Ate, Atis, and Attis; and it was hence called Caieta, and Caiatta. Strabo says, that it was denominated from a cave, though he did not know the precise etymology.‡ There were also in the rock some wonderful subterranean, which branched out into various apartments. Here the ancient Lamii, the priests of Ham, resided:§ whence Silius Italicus, when he speaks of the place, styles it Regnata Lamo Caieta.|| They undoubtedly sacrificed children here, and probably the same custom was common among the Lamii, as prevailed

* Aristol. Ethics, L. 7., c. 6, p. 118.

† Virgil. Æn. L. 7. V. 1.

‡ Strabo, L. 5, p. 357.

§ Ibid., p. 356.

|| Silius, L. 8.

among the Lacedæmonians, who used to whip their children round the altar of Diana Orthia. Thus much we are assured by Fulgentius, and others, that the usual term among the ancient Latines for the whipping of children was Caiatio. Apud Antiquos Caiatio dicebatur puerilis caedes.*

It is generally believed that the Syrens were no other then priestesses of anthropothusiæ temples on the coast of Campania, and they derived their infamous notoriety, most probably, from the part they took in the immolation of shipwrecked mariners; "for Campania at one time was as dreaded as Rhegium and Sicily, for the dangers which awaited those who navigated their coasts." The priestesses were invariably selected with special reference to their personal charms, and the most important part in the service of their temples was singing of hymns in which the Syrens were so far perfect, that they were formerly believed to have been the daughters of Terpsichore according to some, and of Melpomene or Calliope according to others. After quoting the account of the Syrens given by Homer (Od. M. v. 39 et seq.), Bryant says "The story at bottom relates to the people abovementioned, who with their music used to entice strangers into the purview of their temples, and then put them to death. Nor was it music only, with which persons were induced to follow them. The female part of their choirs were (*sic*) maintained for a twofold purpose, both on account of their voices and their beauty. They were accordingly very liberal of their favours, and by these means enticed seafaring persons, who paid dearly for their entertainment."† That Scylla, who destroyed some of the followers of Ulysses and of whom mention has already been made, was a priestess of this class, is now generally admitted. According to Tzetzes, "she was originally a handsome wench, but being too free with seafaring people, she made herself a beast." "Ἦν δὲ πρῶτον Σκύλλα γύνη εὐπρεπής. Ποσειδῶνι δὲ συνοῦσα ἀπεθηριώθη." The story of Saturn devouring his own children—a failing which has also been attributed to Ops, and, according to a passage of Euhemerus transmitted by Ennis, said to have been common among "the rest of mankind"—Saturnum et Opem, cæterosque tum homines humanam carnem solitos esitare—is very justly supposed by Bryant to be due to the practice of immolation of children in the temples of that divinity "in a ceremony styled ὁμοφάγια, at which time they eat the flesh quite crude with the blood. In Crete, at the Dionusiaca they used to tear the flesh with their teeth from the animal, when alive. This they did in commemoration of Dionusus. Festos funeris dies statuunt, et annum sacrum trietericâ consecratione componunt, omnia per ordinem facientes, quæ puer moriens aut fecit, aut passus est. Vivum laniant dentibus taurum, crudeles epulas annuis commemorationibus excitantes. Apollonius Rhodius, speaking of persons like to Bacchanalians,

* De Virgilianâ continentia, p. 762. Bryant's Ancient Myth. II., pp. 15 ff.

† Bryant's Ancient Mythology, II, p. 20.

represents them (*Θυσίῳ ὁμοβοροῖς ἱκελαί*) as savage as the Thyades, who delighted in bloody banquets. Upon this the Scholiast observes, that the Mænades, and Bacchæ, used to devour the raw limbs of animals, which they had cut or torn asunder. In the island of Chios it was a religious custom to tear a man's limb by way of sacrifice to Dionusus. The same obtained in Tenedos. It is Porphyry who gives the account. He was a staunch Pagan, and his evidence on that account is of consequence. He quotes for the rites of Tenedos Euelpis the Carystian. From all which we may learn one sad truth, that there is scarce any thing so impious and unnatural, as not at times to have prevailed.* It is said, Orpheus first put a stop to this disgustingly cruel custom; but, according to some, he only stopped the practice of eating raw flesh, but did not succeed in altogether suppressing the rite.

Referring to the inhabitants of Cyprus, Herodotus says: "The people of this place worship the virgin goddess Artemis; at whose shrine they sacrifice all persons who have the misfortune to be shipwrecked upon their coast: and all the Grecians that they can lay hold of, when they are at any time thither driven. All these they, without any ceremony, brain with a club. Though others say that they shove them off headlong from a precipice, for their temple is founded upon a cliff."† This Artemis was the counterpart of the Indian Kálí, to whom human sacrifices were offered until very recently, as will be shown further on. Even the casting of the victim headlong from the top of a cliff was not unknown in India, for we are informed by Dr. Hendley in his interesting account of the Maiwár Bhíls (*ante* XLIV, p. 350) that "at installations at Jodhpur, buffaloes and goats are to this day sacrificed in front of the four-armed Devi, and thrown down the rock face of the fort. So again, at the very ancient temple of Devi on the Chitor Hill." "These are," he adds, "relics of aboriginal worship;" but of this there is no proof. "A goat is still offered daily at the shrine of Ambá-deví, at Amber the ancient capital of Dhundár, or Jaipúr, as a substitute for the human victim formerly stated to have been sacrificed at the same place." The story of the Deví who wanted and got seven consecutive royal victims from a chieftain of Chitor, so spiritedly narrated by Colonel Tod, must be fresh in the mind of the reader.

The Assyrians, like the people on the shores of the Mediterranean, freely indulged in human sacrifices, and imagined that such sacrifices were the most acceptable offerings they could make to their gods.

According to Diodorus "red-haired men were formerly sacrificed by the Egyptian kings at the altar of Osiris.‡" And Plutarch quotes a

* Bryant's Ancient Mythology, II, pp. 12 ff.

† L. iv, C. 103.

‡ Diodor., I. 88.

passage from Manetho to show that "formerly in the city of Idithya, they were wont to burn even men alive, giving them the name of Typhons, and winnowing their ashes through a sieve to scatter and disperse them in the air; which human sacrifices were performed in public, at a stated season of the year during 873."* Herodotus denied the correctness of these statements; and Sir Gardner Wilkinson argues that "it is directly contrary to the usages of the Egyptians, and totally inconsistent with the feeling of a civilized people;" but religious observances and social customs are such irreconcilable riddles that *à priori* arguments founded on them appear to me to be simply unfit for the elucidation of truth. Few would question the civilization of the Romans—so much higher than that of the Egyptians—or admitting it deny the fact that they devoted their prisoners-of-war to carnage for the entertainment of the people of their metropolis; not to advert to their practice of sacrificing human victims until so recently as the first century before the Christian era, when (A. U. C. 657) during the consulship of Cneius Cornelius Lentulus and P. Licinius Crassus a decree was promulgated by the senate prohibiting human sacrifices.† The horrors of the Inquisition during the middle ages may also be referred to, to show how the immolation of large numbers of men may be consistent with a high state of civilization and a humane religion. Certain it is that the principles on which human sacrifices got into currency were fully recognised by the Egyptians; thus they held that "sacrifices ought not to be of things in themselves agreeable to the gods, but, on the contrary, of creatures into which the souls of the wicked have passed" (Plutarch, *des Is.* s. 31); they offered the entrails of the dead to certain inferior gods or genii; and their kings, after every victory, repaired to the temple of their chief divinity, "performed sacrifice, offered suitable thanksgivings", and lastly "dedicated the spoil of the conquered enemy, and expressed their gratitude for the privilege of laying before the feet of the god, the giver of victory, those prisoners they had brought to the vestibule of the divine abode."‡ It may be that the actual sacrifice of men took place at a very early period, and it was subsequently replaced by emblematic offering; but there is no reason to doubt that at one time or other the rite of anthropothusia did obtain currency among them. Wilkinson, with all his anxiety to defend the credit of the Egyptians, is constrained to admit this.§

The ancient Jews were in many respects better than their neighbours, but the idea of human sacrifice seems not to have been unknown to them. When Abraham was commanded to offer up his son, he did not even evince

* Athen., IV. p. 172.

† Pliny, XXX, c. 3.

‡ Wilkinson's *Ancient Egyptians* II, p. 286.

§ Ibid., II. p. 343.

any repugnance or surprise, and the vow of Jephtha, which was literally carried out by the sacrifice of his daughter, affords a positive proof on the subject. The offering of children to Moloch, which the Jews evidently borrowed from their neighbours, is also remarkable as bearing strongly on the question at issue.

Of all the different races of America, the Aztecs were the most civilized. Their social institutions, their palaces, their elective form of government, were such as to claim for them a very high position as a nation, and yet their addiction to human sacrifice was such as would disgrace the lowest savages. At their coronations, "the new monarch", says Prescott, "was installed in his regal dignity with much parade of religious ceremony; but not until, by a victorious campaign, he had obtained a sufficient number of captives to grace his triumphal entry into the capital, and to furnish victims for the dark and bloody rites which stained the Aztec superstition."* The number immolated at such times was prodigious; nor was the coronation the only time when this horrid rite was celebrated. Adopted in the beginning of the fourteenth century, it was not very frequent at first; "it became", according to the historian, "more frequent with the wider extent of their empire till at length, almost every festival was closed with this cruel abomination."† The total was variously estimated at from twenty thousand to fifty thousand in ordinary years, and rising, on great occasions, such as a coronation or the dedication of an important temple, as that of Huitzilpotchli in 1486, to a hundred thousand. The heads of the victims were preserved in Golgothas, in one of which the companions of Cortes counted one hundred and thirty-six thousand skulls. The details varied according to circumstances, and the nature of the divinity to whose honour the rite was celebrated, but they were generally of the most disgusting and cruel kind possible; attended by preliminary tortures, which Prescott justly compares with the fantastic creations of the Florentine poet as pictured in the twenty-first canto of his 'Inferno'. Neither sex nor age offered an immunity to the unfortunate captive from his cruel doom, and in seasons of draught, infants were particularly sought as the meetest offering to the rain-god Tluloc. The object in this case was exactly the same for which the Khonds of western Orissa sacrificed their Meriah to the Earth Goddess, Tári Pennu, and the manner in which they treated the Meriah corresponds in many respects with that of the Aztecs. The following extract gives the details of an ordinary sacrifice of the Aztecs:

"One of their most important festivals was that in honour of the god Tezcatlepoca, whose rank was inferior only to that of the Supreme Being. He was called 'the soul of the world', and supposed to have been its Crea-

* Conquest of Mexico, I, p. 22.

† Ibid., p. 67.

tor. He was depicted as a handsome man, endowed with perpetual youth. A year before the intended sacrifice, a captive, distinguished for his personal beauty, and without a blemish on his body, was selected to represent this deity. Certain tutors took charge of him, and instructed him how to perform his new part with becoming grace and dignity. He was arrayed in a splendid dress, regaled with incense, and with a profusion of sweet-scented flowers, of which the ancient Mexicans were as fond as their descendants at the present day. When he went abroad, he was attended by a train of the royal pages, and, as he halted in the streets to play some favourite melody, the crowd prostrated themselves before him, and did him homage as the representative of their good deity. In this way he led an easy, luxurious life, till within a month of his sacrifice. Four beautiful girls, bearing the names of the principal goddesses, were then selected to share the honours of his bed; and with them he continued to live in idle dalliance, feasted at the banquets of the principal nobles, who paid him all the honours of a divinity.

"At length the fatal day of sacrifice arrived. The term of his short-lived glories was at an end. He was stripped of his gaudy apparel, and bade adieu to the fair partners of his revelries. One of the royal barges transported him across the lake to a temple which rose on its margin, about a league from the city. Hither the inhabitants of the capital flocked, to witness the consummation of the ceremony. As the sad procession wound up the sides of the pyramid, the unhappy victim threw away his gay chaplets of flowers, and broke in pieces the musical instruments with which he had solaced the hours of captivity. On the summit he was received by six priests, whose long and matted locks, flowed disorderly over their sable robes, covered with hieroglyphic scrolls of mystic import. They led him to the sacrificial stone, a huge block of jasper, with its upper surface somewhat convex. On this the prisoner was stretched. Five priests secured his head and his limbs: while the sixth, clad in a scarlet mantle, emblematic of his bloody office, dexterously opened the breast of the wretched victim with a sharp razor of *itztli*, a volcanic substance hard as flint,—and, inserting his hand in the wound, tore out the palpitating heart. The minister of death, first holding this up towards the sun, an object of worship throughout Anahac, cast it at the feet of the deity to whom the temple was devoted, while the multitudes below prostrated themselves in humble adoration. The tragic story of this prisoner was expounded by the priests as the type of human destiny, which, brilliant in its commencement, too often closes in sorrow and disaster."*

Nor did the Aztecs rest satisfied with this offering to their gods. "The most loathsome part of the story, the manner in which the body of the

* Conquest of Mexico, I, pp. 68ff.

sacrificed captive was disposed of, remains to be told. It was delivered to the warrior who had taken him in battle, and by him, after being dressed, was served up in an entertainment to his friends. This was not the coarse repast of famished cannibals, but a banquet teeming with delicious viands, prepared with art, and attended by both sexes, who, as we shall see hereafter, conducted themselves with all the decorum of civilized life. Surely, never were refinement and the extreme of barbarism brought so closely in contact with each other.* Well may the historian exclaim, "Strange that in every country the most fiendish passions of the human heart have been kindled in the name of religion."

The neighbours of the Aztecs, the Toltecs and the Tezcaucans, as also the Incas, indulged in the loathsome and revolting rite, and often waged war with each other, simply for the sake of obtaining captives for their gods. It is even said that such wars were sometimes amicably arranged solely for the sake of captives for sacrifice.†

In South America, the Peruvians were strongly addicted to human sacrifices, and the Araucanians, though they are said to have been "sensible to the dictates of compassion", and a mild, sensible race averse to cruelty, were nevertheless sometimes given to the same practice. They celebrated a rite called *Pruloucon*, or "the Dance of the Dead", at which a prisoner-of-war was "sacrificed to the manes of the soldiers killed in the war." After subjecting the unfortunate victim to various kinds of ignominy, such as making him ride a horse deprived of his ears and tail, symbolically burying the good deeds of his national chiefs, and the like, "the Toqui, or one of his bravest companions to whom he relinquishes the honour of the execution, dashes out the brains of the prisoner with a club. The heart is immediately taken out by two attendants and presented palpitating to the general, who sucks a little of the blood, and passes it to his officers, who repeat in succession the same ceremony, in the mean time he fumigates with tobacco-smoke from his pipe the four cardinal points of the circle. The soldiers strip the flesh from the bones, and make of them flutes; then cutting off the head, carry it round upon a pike amidst the acclamations of the multitude, while, stamping in measured pace, they thunder out their dreadful war-song, accompanied by the mournful sound of these horrid instruments."‡

Of cannibalism pure and simple, such as that of some of the Pacific Islanders; of the people of Equatorial Africa, some of whom, the Murirumbites for instance, like human flesh raw, and others, like the Wadoc of the Coast, prefer to eat it roasted;§ of the "Mongols, who, according to

* Conquest of Mexico, p. 71.

† Ibid, p. 74. *Vide passim Heaviside's American Antiquities.*

‡ Abbé Don J. Ignatius Molina's History of Chili, II, p. 79.

§ Burton's Lake Regions of Central Africa, II, p. 114; also Du Chaillu's Explorations in Equatorial Africa.

Sir John Maundeville, regarded human ears "sowced in vynegre as a delectable dish"; of the Dyaks of Borneo who delight in "head-hunts"; of some South Eastern Chinese and Japanese of the middle ages, who drank the blood and eat the flesh of their captives, esteeming it the most savoury food in the world; of the Tartars, Türks, Mongols, Tibetans, Javanese, Sumatras and Andamanese* I need say nothing. The facts are well known; and however repulsive it may be to our common humanity to be told of the fact, it cannot be denied, that men under certain circumstances of society, do take to human flesh as an article of food.

That the practice of immolating wives, concubines, and slaves, at first originating from a mistaken sense of the future world and the requirements of the manes, did lead to associating such slaughter with religion can scarcely be doubted. Dr. Thurnem has put together a large number of instances of this practice, and the curious in such matters will find incontrovertible proofs on the subject in the thirty-seventh, the thirty-eighth, and the forty-second volumes of the *Archæologia*. The cruel rite of Sati must have originated from this cause, though the love and constancy of Hindu women soon gave it a high character for devotion as a voluntary sacrifice. The immolation of twelve Trojan youths, along with two dogs and four horses, on the funeral pyre of Patroclus† belongs to this class; and Tertullian says—"Olim quoniam animas defunctorum humano sanguine propitiari creditum est, captivos vel mali status servos mercati in exsequiis immolabant. Postea placuit impietatem voluptati adumbrare. Ita mortem homicidiis consolabantur."‡—It is supposed by some that the broken bones found in the Long Barrows of Great Britain are mostly of persons buried alive along with the individuals to whose honour the barrows were raised. The opinion, however, has, I believe, not been generally accepted by antiquarians.

* Col. Yule has collected a large number of facts illustrative of this subject, and I must refer the reader to his note. Marco Polo, 2nd Ed., I. pp. 302 ff.; II. pp. 245, 265, 275, 292. Adverting to Christianity, he says "The story of King Richard's banquet in presence of Saladin's ambassadors on the head of a Saracen curried (for so it surely was),—

' Soden full hastily
With powder and with spysory,
And with saffron of good colour'

fable as it is, is told with a zest that makes one shudder; but the tale in the *Chanson d'Antioche*, of how the licentious bands of ragamuffins, who hung on the army of the First Crusade, and were known as the *Jufurs*, ate the Turks whom they killed at the siege, looks very like an abominable truth, corroborated as it is by the prose chronicle of worse deeds at the ensuing siege of Thorra." *Loc. cit.*

† II. XXIII, 239.

‡ Tertullian, *De Spectaculis*, XII.

The human sacrifices in the temples on the eastern shore of the Mediterranean, to which reference has already been made, were often connected with soothsaying, the priests foretelling the future from the appearance of the entrails of the victim, and elsewhere the connexion of human sacrifice with necromancy, magic, sorcery, and other dark arts can be easily pointed out. Some alchemists slaughtered infants to help them in their attempt at discovering the elixir of life ; but I doubt if it led to any religious sacrifice.

The only two instances I am aware of of periodical jail delivery of prisoners sentenced to capital punishment leading to a religious festival, are the horrid rite which keeps the Ashantis in a whirl of excitement for a whole week every year, and that of the Yucatan ;* but they are quite enough to show that the conclusion I wish to draw from them, is perfectly legitimate.

The Persians were, perhaps, the only nation of ancient times who did not indulge in human sacrifice. As constituting the agricultural section of the great Aryan race, they contented themselves by offering the fruits of the field for the gratification of their divinity. And the Hindus, as more intimately connected with them than with the other branches of the Aryan race, we may suppose, did not differ much from the Persians ; but it is also certain that religious differences, depending principally upon the leaning of the Hindus in favour of animal sacrifice, made them break off from their brethren, and depart from their primitive home, and what is true of the Persians need not, therefore, necessarily be so of the Hindus. Besides there is nothing to show that they were incapable of doing what their contemporaries, the Assyrians, Egyptians, Greeks, and Romans did in the way of religious rite, and what appears from the instances quoted above to have been a failing or predeliction common to almost all mankind. They were certainly highly civilized for the time in which they flourished, and the spirit of their institutions was so benign and pacific, that it may strike us as inconsistent to associate with it the disgusting rite of human sacrifice. Arguing upon these premises, Colebrooke and Wilson have come to the conclusion "that human sacrifices were not authorised by the Veda itself, but were either then abrogated and an emblematic ceremony substituted in their place, or they were introduced in later times by the authors of such works as the Kaliká Purána."† As a Hindu writing on the actions of my ancestors—remote though they are,—it would have been a source of great satisfaction to me if I could adopt this conclusion as true ; but I regret I cannot do so consistently with my allegiance to the cause of history. Doubtless the institutions of the Vedic Hindus were of a benign and humane character, and that they did not tolerate brutality to the extent that other ancient nations indulged in, I can well believe ; but it must be added also that benign and

* Fancourt's History of Yucatan, p. 126.

† Journal, R. As. Soc., XIII, p. 107.

humane as was the spirit of the ancient Hindu religion, it was not at all opposed to animal sacrifice ; on the contrary, most of the principal rites required the immolation of large numbers of various kinds of beasts and birds. One of the rites enjoined required the performer to walk deliberately into the depth of the ocean, and drown himself to death. This was called *Maháprasthána*, and is forbidden in the present age. Another, an expiatory one, required the sinner to burn himself to death, on a blazing pyre—the *Tushánala*. This has not yet been forbidden ; and it is what Calanus performed in the presence of Alexander the Great. The gentlest of beings, the simple-minded women of Bengal, were for a long time in the habit of consigning their first-born babes to the sacred river Ganges at Ságara Island, and this was preceded by a religious ceremony, though it was not authorised by any of the ancient rituals. For centuries men have courted death under the wheels of Jagannátha's car, under the delusion of that being the most meritorious act of devotion which they could perform, and with the fond assurance that they would thereby secure for themselves the highest reward in a future life. And if the spirit of Hindu religion has tolerated, countenanced, or promoted such acts, it would not be by any means unreasonable or inconsistent to suppose that it should have, in primitive times, recognised the slaughter of human beings as calculated to appease, gratify, and secure the grace of, the gods.

But to turn from presumptive evidence to the facts recorded in the Vedas. The earliest reference to human sacrifice occurs, according to the Hindus, in that most ancient record of the Aryan race, the *Saṁhitá* of the Rig Veda, to which obviously Colebrooke and Wilson refer by the use of the word Veda in the singular number. The first book of that work includes seven hymns* supposed to have been recited by one *Sunahsépha* when he was bound to a stake, preparatory to being immolated. He prays earnestly that he may be allowed "to behold again his father and mother" ; that "Varuṇa, undisdainful, may bestow a thought upon him" ; that "he may not take away his existence" ; that "he may not make the petitioner an object of death" ; that he "may loose the petitioner from the upper bonds, and untie the centre, and the lower, so that he may live." One verse says "*Sunahsépha*, seized and bound to the three-footed tree (the sacrificial post), has invoked the son of Aditi ; may the regal Varuṇa, wise and irresistible, liberate him ; may he let loose his bonds." (p. 63.) These quotations afford a strong presumptive evidence that *Sunahsépha* was intended for a sacrifice ; though there be no positive mention of the fact in the *Saṁhitá*, and the hymns contain many prayers for wealth, cattle, and other blessings, which any person may ask without being in the position of a victim at a cruel sacrifice.

* Wilson's Rig Veda, I, pp. 59 f.

The Aitareya Bráhmaṇa of the Rig Veda gives the details of the story which connects these hymns with a human sacrifice. The story has been quoted at length by Wilson, in his paper "On the sacrifice of Human Beings as an Element of the Ancient Religion of India"* and by Max Müller, in his "Ancient Sanskrit Literature" (pp. 408 ff.) ; who has also printed the text, and pointed out the variations of the Sāṅkhāyana Sūtra version of it (*ibid*, p. 573) ; it likewise occurs in its place in Haug's translation of the Aitareya Bráhmaṇa (pp. 460 ff.), I need not, therefore, reproduce it here. Suffice it to say that according to it, one Harishebandra had made a vow to immolate his first-born to Varuṇa, if that divinity would bless him with children : a child was born named Rohita, and Varuṇa claimed it ; but the father evaded fulfilling his promise, until Rohita, grown up to man's estate ran away from home, when Varuṇa afflicted the father with dropsy ; at last Rohita purchased one S'unahsépha from Ajigarta for a hundred head of cattle, had him tied to a stake, and was about to have him immolated in redemption of his father's vow to Varuṇa, when the victim, at the suggestion of Viśvámitra, recited the hymns, and was thereby released. The story is, with some slight variations in minor details, reproduced in the Rāmāyana, the Mahābhārata, and the Bhāgavata Purāṇa. The Aitareya Bráhmaṇa gives seriatim the initials of the several hymns as they were supposed to have been recited, and as they occur in the Saṁhitā, but the other works refer to them generally, without any specific quotation.

It is unquestionable that the works in which the story is given, are of ages long subsequent to the date of the Saṁhitā, and their evidence cannot be accepted as conclusive. Arguing upon this datum and the absence of all mention of a human sacrifice in the Saṁhitā, Rosen, Wilson and others are of opinion that the hymns cannot be associated with a human sacrifice. Wilson explains that the "upper, middle, and lower bonds" referred to in the hymns, and which Indian commentators accept to mean the thongs with which the head, the waist, and the legs of the victim were tied to the sacrificial post, have been used metaphorically to imply the bondage of sin ; but he admits that the reference to the "three-footed tree," the sacrificial post, "is consistent with the popular legend."† He says nothing about the seizure, referred to in the verse above quoted, but that too affords a strong argument in favour of the interpretation adopted by the author of the Aitareya Bráhmaṇa. We have also to bear in mind that, whatever their age, the Bráhmaṇas are the oldest exposition we possess, of the origin, scope and purport of the hymns of the Saṁhitās, dating as they do, according to European orientalists, from five to ten centuries before the Christian era, and to reject their interpretation in favour of conclusions drawn by persons of this century, would be to reject proof in favour of conjecture ; and that conjecture

* Journal, R. As. Soc., XIII, pp. 96 ff.

† Rig Veda, I, p. 63.

founded in many instances upon very contracted and narrow views of modern canons of criticism, of laws of unity and propriety, of consistency and habits and modes of thinking, which are not always applicable to those records.

It may be noted also that the conclusion drawn by the learned orientlists from the above facts is, that the sacrifice of human beings did not form an element of the ancient religion of India, and this is not warranted by the premises. Doubtless the details of a sacrifice are not given in the Sañhitá, but, taking the Sañhitá to be, as it unquestionably is, only a collection of hymns divested of all connecting links, we have no right to expect them there. It would be as reasonable to expect all the details of a story in a hymn improvised by the hero of it, to meet a particular contingency, as to expect the whole plot of a novel from a single speech in it. The absence of reference to any rite, custom, or observance, in a book of hymns, however sacred that book may be, is no proof of that rite, custom, or observance having never existed among those who held the said hymns to be sacred. To accept it as such, is to attach an importance to negative evidence to which it has no claim, and in the case under notice there is enough, as shown above, to warrant an opposite conclusion.

Besides, "the ancient religion of India", referred to by the learned Professors Wilson and Rosen, can mean either the religion of the aborigines, or that of the Indo-Aryans, and as in the case of the former no reference would be required to the Vedas, it is to be presumed that the early religion of the Indo-Aryans is referred to; and if so, we cannot look to the Sañhitá apart from the Bráhmaṇas. What we call ancient Hinduism is founded on the Bráhmaṇas, and cannot possibly be dissociated from it. We can easily conceive that the religion of the Aryans before they had finally settled in India differed from it in many respects, and we can found conjectures about it on certain slender facts to be gleaned from the Sañhitá of the Rig-Veda and the Zendavesta; but we cannot, without misleading, call that religion, whatever it was, "the religion of ancient India." The Bráhmaṇas may have, for aught we know to the contrary, changed the ancient rites, and introduced new ones; and it is unquestionable that many of their legends and anecdotes were got up merely by way of illustrations, and have no claim to be believed as true, (the professors of the Mimáṃsá school stigmatize them often as *arthaváda* or eulogistic) but we cannot discard them, and replace their testimony by conjecture.

At any rate the story of Śunahśepha must be accepted as a positive proof in favour of the theory that at the time of the Aitareya Bráhmaṇa, the Hindus did tolerate human sacrifice. To assume that the sacrifice referred to in it was a symbolical one in which there was no intention whatever to make a sanguinary offering, would be totally to destroy the *raison d'être* of the legend, to divest it of all its sensational elements, and to make it

quite flat, stale, and unprofitable. The great object of the legend, whether it be intrinsically true or false, was to extol the merits of the hymns in rescuing a victim from a sacrificial stake; but if the stake be divested of its horrors, that object would be entirely defeated. Then, if Harischandra did not intend actually to give up his son to Varuṇa, the promise to "sacrifice his son when born" would be unmeaning, and the frequent evasions he resorted to, by saying, "an animal is fit for being sacrificed when it is more than ten days old"; "it is not fit for sacrifice until it has teeth"; "it is not fit until the milk teeth are shed"; "it is not fit until the permanent teeth are all come out"; "a man of the warrior caste is fit for being sacrificed only after having received his full armour", were quite uncalled for, and gratuitous attempts at cheating a dread divinity whom he adored, and to whom he was bound by a solemn vow; for he could have at any time easily subjected the son to the ceremony of being tied to a stake, and after repeating a few mantras over him let him off, perfectly sound in wind and limb. The running away of the son from his father would also be unmeaning; the purchase of a substitute stupid; the payment of a fee of a hundred head of cattle to undertake the butcher's work quite supererogatory; and the sharpening of the knife by Ajigarta a vain preliminary. The Bráhmaṇa makes Sunahśepha express much disgust at the sight of Ajigarta, his father, sharpening a knife to slaughter him. "What is not found even in the hand of a Súdra", it makes him say, "one has seen in thy hand, the knife to kill thy son"; but it has not a word in depreciation of the rite itself. It is said in the Bráhmaṇa that Sunahśepha, after his rescue, was so disgusted with his father that he forsook him, and became the adopted son of Viśvámitra, who named him *Devarát* or *Diodotus*, "the god-given", and became the head of one of the several branches of the descendants of Viśvámitra. Sunahśepha was a grown-up man at the time, and was perfectly familiar with the Śástras, for he is described to have, immediately after, officiated at the ceremony, and to have introduced some innovations in the ritual; if the whole rite were purely symbolical, he had no business to be offended with his father, a learned Bráhmaṇ of high caste, and become the adopted son of a Kshatriya.

The writer of this note claims to be a descendant of this Devarát, and, in common with a large number of men in different parts of India, at every solemn ceremony, is required by the Śástras and the custom of his ancestors to describe himself as belonging to the tribe (*gotra*) of Viśvámitra, and of the family (*pravara*) of Devarát; he is not prepared, therefore, to say that Sunahśepha is purely a mythical personage; and seeing that, until the beginning of this century, the practice of offering the first-born to the river Ganges was common, and the story simply says that Sunahśepha was offered to the water-god Varuṇa as a substitute for the first-born Rohita,

he can perceive nothing in it inconsistent or unworthy of belief. The rescue, of course, is due to the intervention of Viśvámitra, as supposed by Wilson, and not to the efficacy of the hymns, but that was not intended to form the most salient point of the story.

Exception has been taken to the theory of the sacrifice having been originally intended to be real on the ground of a story in the Aitareya Bráhmaṇa which narrates that "the gods once killed a man for their sacrifice, but that part in him which was fit for being made an offering, went out and entered a horse"; then the horse being killed, it went to an ox; and the ox being killed, it went to a sheep; and the sheep being killed, it went to a goat; and the goat being killed, it went to the earth; and the gods, guarding the earth, seized the rice, the produce thereof, which, made into cakes, formed the best offering, and all the animals from which the sacrificial part had gone, became unfit for being sacrificed, and no one should eat them.* This story,

* I quote the entire passage from Haug's translation to enable the reader to judge for himself:

"The gods killed a man for their sacrifice. But that part in him which was fit for being made an offering, went out and entered a horse. Thence the horse became an animal fit for being sacrificed. The gods then dismissed that man after that part which was only fit for being offered had gone from him, whereupon he became deformed.

"The gods killed the horse; but the part fit for being sacrificed (the *medha*) went out of it, and entered an ox; thence the ox became an animal fit for being sacrificed. The gods then dismissed (this horse) after the sacrificial part had gone from it, whereupon it turned to a white deer.

"The gods killed the ox; but the part fit for being sacrificed went out of the ox, and entered a sheep; thence the sheep became fit for being sacrificed. The gods then dismissed the ox, which turned to a gayal (*Bos gaurus*).

"The gods killed the sheep; but the part fit for being sacrificed went out of the sheep, and entered a goat; thence the goat became fit for being sacrificed. The gods dismissed the sheep, which turned to a camel.

"The sacrificial part (the *medha*) remained for the longest time (longer than in the other animals) in the goat; thence is the goat among all these animals pre-eminently fit for being sacrificed.

"The gods killed the goat; but the part fit for being sacrificed went out of it, and entered the earth. Thence the earth is fit for being offered. The gods then dismissed the goat, which turned to a Śarabha.

"All those animals from which the sacrificial part had gone, are unfit for being sacrificed; thence one should not eat (their flesh).

"After the sacrificial part had entered the earth, the gods surrounded it (so that no escape was possible); it then turned to rice. When they (therefore) divide the Purodāsa into parts, after they have killed the animal, then they do it, wishing "might not animal sacrifice be performed with the sacrificial part (which is contained in the rice of the Purodāsa) ! might our sacrificial part be provided with the whole sacrificial essence !" The sacrificial animal of him who has such a knowledge becomes then provided with the sacrificial part, with the whole sacrificial essence. The Purodāsa (offered at the animal sacrifice) is the animal which is killed. The chaff and straw of the rice of which it con-

however, proves too much. If it is to be accepted as an evidence against the existence of human sacrifice in the time of the Aitareya Bráhmaṇa, it must be allowed to tell equally against all animal sacrifices; but curiously enough, immediately after the story, the Bráhmaṇa supplies the necessary mantras for offering the omentum (*Vapá*) of a slaughtered animal; and, in five hundred different places, it furnishes directions for selecting, offering, slaughtering, and dividing among the officiating priests, goats, sheep, oxen, and other animals. In short, all the principal rites of the Bráhmaṇa period required animal sacrifices, and it would be absurd to believe on the strength of the story in question that in the time of the Aitareya Bráhmaṇa there was no horse sacrifice, no cow sacrifice, no goat sacrifice, and everywhere rice cakes were substituted for sanguinary offerings. It would be equally absurd for the Puráṇas to prohibit the Purusha-medha and the horse sacrifice in the Káliyuga, if they had been already prohibited in the Vedas. The fact, however, is, the story is simply eulogistic (*arthaváda*) and not at all intended to be prohibitive. In the Bráhmaṇas every rite, when being enjoined, is the best of rites, as in the Puráṇas every sacred pool is the holiest of the holy, and every god the greatest among gods; and as the object of the story was to praise the rice cake, it at once made it supersede all other kinds of offering. The Mīmāṃsakas invariably adopt this style of explanation to reconcile all contradictory passages in the Vedas, and it is, I think, the only reasonable one that can be adopted in such cases. Jaimini distinctly lays down that "nothing is binding in the Vedas, which is not positively enjoined as a duty" (*Chodanálakshano'rtho dharmah*), and devotes a whole chapter (Book I, Chap. 2,) to what are mere *arthaváda* or eulogistic, including all Vedic legends under that head.

Colebrooke's opinion on the subject was founded upon a passage in the Satapatha Bráhmaṇa of the White Yajur Veda, in which the human victims at a Purushamedha are recommended to be let off after certain mantras had been repeated over them; but that passage cannot be accepted as a proof in the case under notice. The word *Purusha-medha*, it is true, literally means "a human sacrifice"; but it is not a common term descriptive of every rite in which a human victim is offered to the gods, for there were

sists are the hairs of the animal, its husks the skin, its smallest particles the blood, all the fine particles to which the (cleaned) rice is ground (for making, by kneading it with water, a ball) represent the flesh (of the animal), and whatever other substantial part is in the rice, are the bones (of the animal). He who offers the Purodáśa, offers the sacrificial substance of all animals (for the latter is contained in the rice of the Purodáśa). Thence they say: the performance of the Purodáśa offering is to be attended to.

"Now he recites the Yájyá for the Vapá (which is about to be offered) Yuvam etáni divi, *i. e.*, Ye, O Agni and Soma, have placed, by your joint labours, those lights on the sky! Ye Agni and Soma, have liberated the rivers which had been taken (by demons), from imprecation and defilement." *Haug's Translation*, pp. 90 ff.

several such ; but a technical one, implying a specific ceremony to be performed in the spring season, according to certain fixed and well defined rules, which, according to the Purápas was altogether prohibited in the present iron age, and has no relation whatever to the sacrifice of children in redemption of vows. Whether the latter was ever prohibited or not, I cannot state positively ; but that the sacrifice of Sunahsépha to the water-god Varuṇa was the type on which the offering of infants to the water-goddess Gangá at the confluence of the river of that name with the sea, the emblem of the water-god Varuṇa, I have no reason to doubt ; and the latter was duly and pretty extensively observed for centuries, until finally put down by the British Government at the beginning of this century. It should be added here that the offering did not invariably or even generally lead to a murder, for a priest or bystander generally took up the child from the water, and brought him up as a foster son, very much in the same way as Viśvámitra did in the case of Sunahsépha.

The *Purusha-medha* was celebrated for the attainment of supremacy over all created beings. Its performance was limited to Bráhmaṇas and Kshatriyas. It could be commenced only on the tenth of the waxing moon in the month of Chaitra, and altogether it required forty days for its performance, though only five out of the forty days were specially called the days of the *Purusha-medha*, whence it got the name of *Pancháha*. Eleven sacrificial posts were required for it, and to each of them was tied an animal fit for Agni and Soma, (a barren cow) the human victims being placed between the posts.

The earliest indication of this rite occurs in the Vájasaneyí Sañhitá of the White Yajur Veda. The passage in it bearing on the subject is supposed to describe the different kinds of human victims appropriate for particular gods and goddesses. The section, in which it occurs, opens with three verses which, the commentator says, were intended to serve as mantras for offerings of human victims. Then follows a series of one hundred and seventy-nine names of gods in the dative case, each followed by the name of one or more persons in the objective case ; thus "to Brahma a Bráhmaṇa, to Kshatra a Kshatriya," &c. The copula is nowhere given, and it is quite optional with the reader to supply whatever verb he chooses. The whole of these names has been reproduced in the Taittiríya Bráhmaṇa of the Black Yajur Veda, with only a few slight variations, and in some cases having the verb *álabhate* after them. This verb is formed of the root *labh* "to kill" with the prefix *á*, and commentators have generally accepted the term to mean slaughter, though in some cases it means consecration before slaughter. The century of Bráhmaṇas of the White Yajur Veda also accepts the passage to be descriptive of human victims, and under the circumstance we may unhesitatingly take it in that sense, though the arguments by which the hymns

of the Rig Veda have been attempted to be divorced from their commentary in the Aitareya Bráhmaṇa may be fairly brought to bear upon it.

As the passage in the Taittiriya is a curious one, though long, I shall quote it entire, pointing out within brackets in the foot notes the differences observable in the Vájasaneyi Sañhitá. It runs thus :

1. "To a (divinity of the) Bráhmaṇ (caste), a Bráhmaṇa should be sacrificed (*álabhate*) ; 2. To a (divinity of the) Kshatriya (caste), a Kshatriya ; 3. To the Maruts, a Vaisya ; 4. To Tapas (the divinity presiding over penances), a Súdra ; 5. To Tamas (the presiding divinity of darkness) a thief ; 6. To Naraka (the divinity of hells), a Virāṇa (one who blows out sacrificial fires) ; 7. To Pápaman (the divinity of sins), a hermaphrodite (or a eunuch) ; 8. To Akraya (the divinity of commerce), an Ayogu (one who acts against the ordinances of the Sástra) ; 9. To Káma (the divinity of love), a courtesan ; 10. To Atikrushta (a detested divinity), a Mágadha (the son of a Vaisya by a Kshatriya woman)* ;

11. To Gíta (the divinity of music), a Síta or musician (the son of a Kshatriya by a Bráhmaṇa woman) ; 12. To Nṛitta (the divinity of dancing), one who lends his wife to another (a cuckold)† ; 13. To Dharma (the divinity of duty), one who frequents assemblies and preaches morality ; 14. To Narma (the divinity of humour), a wit ; 15. To Narishta (a dependent goddess), a coward ; 16. To Hasa (the divinity of laughter), a person of an ambling gait ; 17. To Ananda (the divinity of delight), a favourite of women ; 18. To Pramada (the divinity of joy), the son of an unmarried woman ; 19. To Medhá (the goddess of intelligence), a coach-builder ; 20. To Dhairya (the divinity of patience), a carpenter (carver) ;‡

21. To Śrama (the divinity of labour), the son of a potter ; 22. To Máya (the divinity who delights in art), a blacksmith ; 23. To Rúpa (the divinity of beauty), a jeweller ; 24. To the divinity of prosperity, an agriculturist (sower of seeds, *vapa*) ; 25. To Saravyí (the divinity of arrows), an arrow-maker ; 26. To Hetí (the goddess of arms), a bow-maker ; 27. To Karma (the divinity of art-work), a bowstring-maker ; 28. To Dishta, a maker of

* ब्रह्मणे ब्राह्मणमाह्वते । चवाय राजन्यं । मरुद्भ्यो वैश्वं । तपसे शुद्रं । तमसे तस्करं । नारकाय वीरणं । पापमे क्रीवं । आक्रयायायोग् । कामाय पुच्छलू । अतिक्रुष्टाय मागधं ॥ १ ॥

† The Vájasaneyi Sañhitá assigns the Síta to Nṛitta, and the cuckold to Gíta.

‡ गीताय सूतं श्रुताय शैलूषं । [श्रुताय सूतं गीताय शैलूषं] धर्माय सभाचरं । नर्माय रेभं । नरिष्टाय भीमलं । हसाय कारिम् । आनन्दाय स्त्रीपुत्रं । प्रमदे कुमारीपुत्रं । मेधाये रथकारं । धैर्याय तच्चणं ॥ १ ॥

ropes ; 29, to Mrityu, (the divinity of death) a hunter ; 30, to Antaka, (the divinity of murder) a person delighting in hunting with dogs ;*

31, To Sandha, (the divinity of assignation) a person given to adultery ; 32, to Geha, (the divinity of homesteads) one who lives in concubinage ; 33, to Nirriti, (the goddess of misfortune) one who has married before his elder brother ; 34, to Árti, (the goddess of pain) one who wishes to marry before his elder brother ; 35, to Arádhī, (the divinity who causes obstruction to enterprise) one who has married a widow ; 36, to Pavitra, (the divinity of purity) a physician ; 37, to Prajñāna, (the divinity of time) an astronomer ; 38, to Niskṛiti, (the goddess of success) the wife of a goldsmith ; 39, to Bala, (the divinity of strength) a girl who is forcibly taken and kept as a concubine for food and raiment, but no pay ; 40, to Varṇa, (the divinity of colours) one who works for the sake of another, not for himself ;†

41, To the gods of rivers, a fisherman, (Paunjishta) ; 42, to the regents of lonely places, a Naisháda ; 43, to the god who claims to be the noblest of males, an excessively vain man ; 44, to the gods of heroes, an insane man ; 45, to the Gandharvas and their wives, one who has not been duly purified by the initiatory rites (a Vrátya) ; 46, to the regents of snakes, and snake-charmers, one unfit for the initiatory rites ; 47, to the guardian gods, a gambler ; 48, to Iryatá, (the goddess of food) one who abstains from gambling ; 49, to the Piśáchas, a basket-maker ; 50, to the Yátudhānas, (a race of demons) a gardener, or one who puts up a thorny hedge ;‡

51, To those gods who frustrate undertakings, a hunchback ; 52, to Pramada, (the divinity of excessive joy) a dwarf ; 53, to those goddesses who are the guardians of gates, a diseased person ; 54, to the presiding divinity of dreams, a blind man ; 55, to the divinity of sin, a deaf man ; 56, to the divinity of sense, one who wins her husband's affection through charms or filters ; 57, to the divinity of profuse talk, a bore ; 58, to the goddess who is little conversant with the Vedas, a sceptic ; 59, to her who is conversant with them, one who is proficient in questioning ; 60, to her

* अमाय कौलालं । [तपमे कौलालं] । मायायै काम्नारं । रूपाय मणिकारं । शुभे वपं । शरण्याया इषुकारं । चेत्ये धन्वकारं [धनुष्कारं] । कर्मण्ये आकारं । दिशाय रज्जुसर्गं । मृत्यवे स्रग्यं । अन्तकाय अनितं ॥ २ ॥

† सन्धये जारं । गृह्णायोपपतिं । निर्वृत्ये परिवित्तं । [निर्वृत्ये परिविविदानं] । आर्तं परिविविदानं । [आर्तं परिवित्तं] । आराधे दिदिषुपतिं । पवित्राय भिषजं । प्रज्ञानाय नक्षत्रदर्शं । निष्कृत्ये पेशस्कारी । बलायोपदां । वणायानुबधं ॥ ४ ॥

‡ नदीभ्यः पौञ्जिष्टं । शस्त्रीकाभ्यो नैषादं । पुष्यप्राय दुर्मदं । प्रयुद्धभ्यः उन्मनं । गन्धर्वापुरोभ्यः व्रात्यं । सर्पदेवजनेभ्यः अप्रतिपदं । अवेभ्यः [अयेभ्यः] कितवं । इर्यताया अकितवं । पिशाचभ्यो विदलकारं [विदलकारं] । दातुधानेभ्यः कण्टककारं [कण्टकीकारं] ॥ ५ ॥

who presides over the purport of the Sāstras, one who is able to meet arguments ; *

61, To the divinity of thieves, one proficient in thieving ; 62, to one who prides in killing heroes, a tattler ; 63, to one who presides on gains, a charioteer ; 64, to the divinity who protects royal treasuries, a treasurer or revenue-collector ; 65, to the mighty, a servant ; 66, to the majestic, an officer, or an assistant ; 67, to the dear one, a sweet speaker ; 68, to the uninjurious, a cavalier ; 69, to the intelligent, or him who is proficient in a knowledge of religious rites, a washer-woman ; 70, to the most loving, a female dyer ; †

71, To the refulgent, a collector of fuel ; 72, to the highly refulgent, a fire-man, or lighter of fires ; 73, to him who dwells on the top of heaven, one who officiates at a coronation ; 74, to the regent of the region of the sun, a polisher of metal pots ; 75, to him who prides himself on being of the region of the Devas, one who causes enmity ; 76, to him who resides in the region of the mortals, one who foment quarrels among those who are in peace ; 77, to those who belong to all regions, a peacemaker ; 78, to him who presides over deaths by penance, one who meddles in quarrels ; 79, to him who prides himself on being of heaven (*svarga*), one who collects the dues of a king from his subjects ; 80, to the most aged of heaven, a table-servant ; ‡

81, To the wavy-mover, an elephant-keeper, or máhut ; 82, to the swift, a groom ; 83, to the robust, a cowherd ; 84, to the vigorous, a goat-herd ; 85, to the energetic, a shepherd ; 86, to the divinity of food, a ploughman ; 87, to that of water, a distiller, or vintner ; 88, to that of welfare, a householder ; 89, to that of prosperity, an owner of wealth ; 90, to him who is the immediate cause of all things, the servant of a charioteer, or an assistant charioteer ; §

* उक्तादेभ्यः कुलं । प्रमुदे वामनं । दाम्यः खामं । सप्रयात्वं । अधर्माय बधिरं । सञ्ज्ञानाय सूरकारं । प्रकामोद्यायोपसर्द । आशिलायै प्रश्ननं । उपशिक्षाया अभिप्रश्ननं । मर्यादायै प्रश्नविकारं ॥ ६ ॥

† अत्यै स्तेनहृदयं । वैरहत्याय पिशुनं । विविक्तैश्च चत्तारं । औपद्रष्टाय सङ्गृहीतारं । [अनुचत्तारं] । बलायानुचरं । भूम्ने परिस्कन्दं । प्रियाय प्रियवादिनं । अरिष्टाय अश-
सादं । मेधाय वामः पल्लूली । प्रकामाय रजयित्री ॥ ७ ॥

‡ भायै दार्याचारं । प्रभाया आग्नेत्वं । नाकस्य शृष्टायाभिषेक्तारं । ब्रह्मस्य विष्टपाय पावनिर्नेगं । देवलोकाय पेशितारं । मनुष्यलोकाय प्रकरितारं । सर्वेभ्यो लोकेभ्य उप-
सेक्तारं । अवर्तैश्च बधायोपमन्यितारं । सुवर्गाय लोकाय भागदुषं । वार्षिष्ठाय नाकाय परिवेष्टारं ॥ ८ ॥

§ अर्द्धेभ्यो हस्तिपं । जवायाश्चपं । पुष्टैर्गोपालं । तेजसेऽजपालं । वीर्यायावि-
पालं । इरायै कीनाशं । कीलालाय सूरकारं । मद्राय गृहपं । श्रेयसे वित्तपं । अध्व-
यानुचत्तारं ॥ ९ ॥

91, To the mentally wrathful, a blacksmith, or one who works at a forge; 92, to the manifestly angry, one who leads a convict to execution; 93, to him who presides over griefs, a groom who runs before a chariot; 94, to the two who preside over gains above and below one's expectation (*Utkula* and *Vikula*), a cripple who cannot move even with the help of a crutch; 95, to him who presides over expected profits, one who harnesses a horse to a chariot; 96, to him who protects gains, one who unharnesses a horse; 97, to the portly-bodied, the son of one who is addicted to her toilet; 98, to him who presides over politeness, one who puts collyrium on his eyes; 99, to the divinity of sin, a maker of leather sheaths for swords; 100, to Yama, (the destroyer of life) a barren woman;*

101, To Yamí, a mother of twins; 102, to the goddesses who preside over the mantras of the Atharva Veda, a woman who had aborted; 103, to the divinity of the first year of Jupiter's cycle, a woman who is confined long after due time; 104, to that of the second year of ditto, one who has not conceived for the second time; 105, to that of the third year of ditto, one who is able to bring on delivery before due time; 106, to that of the fourth year of ditto, one who can delay delivery; 107, to that of the fifth year of ditto, one who becomes lean without delivery, 108, to one who produces a misleading impression of the world, a woman who appears old in her youth; 109, to the divinity of forests, a forest-ranger or keeper; 110, to the divinity of a side forest, one who protects forests from fires;†

111, To the divinities of lakes, a fisherman who catches fish both in water and also from the bank; 112, to those of ponds one who catches fish with hooks; 113, to those of bays, (or streamless waters near woods,) one who earns his livelihood with a net; 114, to those female divinities who preside over waters amidst prairies, one who earns his livelihood with fishing-hooks; 115, to the divinity of the further bank, a Kaivarta, (or one who hunts fish from the banks); 116, to that of the near bank, a Márgára, (or one who catches fish with his hands only); 117, to the divinities of fords, one who catches fish by putting up stakes in water; 118, to those who preside over other than fords, one who earns his livelihood by catching fish with nets; 119, to those who preside over sounding waters, one who catches fish by poisoning them

* भन्यवश्यस्तापं । क्रोधाय निसरं । शोकाय भिसरं । उत्कूलविकूलाभ्यां [उत्कूल-
विकूलेभ्यः] विस्त्रिनं । योगाय योक्तारं । चेमाय विमोक्तारं । वपुषे मानस्कृतं । शीला-
याङ्गनीकारं । निर्जट्यै कोशकारीं । यमायास्तुम् ॥ १० ॥

† यम्यै यमस्तुं । अथर्वभ्योऽवतोकां । संवत्सराय पर्यारिणीं । परिवत्सरायाविजा-
नां । इदावत्सरायापस्कदरीं । इदत्सराया नीलरीं । [इदावत्सरायातीलरीं । इदत्सरा-
यातिस्कदरीं] । वत्सराय विजर्जरां । संवत्सराय पलिङ्गीं । वनाय वनपं । अन्यतोऽरण्याय
दावपं ॥ ११ ॥

with poisoned leaves placed on the water; 120, to those of caverns in mountains, a Kiráta (or hunter); 121, to those of peaks of mountains, a Yambhaka; 122, to those of mountains, a Kimpurusha;*

123, To the divinity of echoes, a news-dealer; 124, to that of sounds, an incoherent speaker; 125, to that of fading sounds, one who speaks much; 126, to that of unending sound, a dumb person; 127, to that of loud sound, a player on the Viná; 128, to that of musical sounds, a player on the flute; 129, to that of all kinds of sounds, a trumpeter; 130, to that of sounds other than sweet, a blower of conch-shells; 131, to those who preside over the seasons, one whose profession is to collect fragments of skins; 132, to those of statesmanship, (or of time, place and opportunities, for peace negotiations,) a preparer of musical instruments with leather;†

133, To the goddess presiding over abhorrence, a (man of the) Paulkasa (caste); 134, to the goddess of affluence, one who is always careful or wakeful; 135, to that of indigence, a careless or sleepy person; 136, to that of scales (or weighing instruments,) a purchaser; 137, to the god presiding over the radiance of jewels, a goldsmith; 138, to the Viśvedevas, a leper; 139, to the divinity of diseases other than leprosy, a naturally lean person; 140, to the goddess of motion, a scandal-monger; 141, to that of prosperity, one who is not impudent; 142, to the god of decay, one who splits wood; (?)‡

143, To the divinity of mirth, a loose woman should be sacrificed; 144, to that of song, a player on the Viná and a songster; 145, to that of aquatic animals, a Sábulyá (one whose body is brindled, or has two colours, a piebald woman); 146, to that of congratulatory words, a woman of perfect form; 147, to that of dancing, one who plays on flutes, one who leads the octave in a chorus, and one who beats time with his hands; 148, to that of manifest delight, one who invites people to a dance, or one who makes a sound to indicate the cessation of a dance; 149, to that of internal de-

* सुरोभ्यो धैवरं । वेशन्ताभ्यो दाशं । उपस्थावरीभ्यो वैन्द । [वैशन्ताभ्यो वैन्द । उपस्थावराभ्यो दाशं ।] नद्वलाभ्यः शौष्कलं । पार्याय कैवर्तं । अवार्याय मार्गारं । [पाराय मार्गारं । आवाराय कैवर्तं] । तीर्थेभ्य आन्द । विषमेभ्यो मैनालं । स्वनेभ्यः पर्णकं । गुहाभ्यः किरातं । सानुभ्यो जम्भकं । पर्वतेभ्यः किम्पूरुषं ॥ १२ ॥

† प्रतिश्रुत्वाया ऋतुलं । घोषाय भयं । अन्ताय वडवादिनं । अनन्ताय मूर्कं । महसे वीणावादं । क्राशाय तूणवध्मं । आक्रन्दाय दुन्दुभ्याघातं । अवरसराय शङ्खध्मं । ऋभ्योऽजिनसन्धार्यं । साधेभ्यश्चर्मम्याम् ॥ १३ ॥

‡ वीमत्वायै पौलकसम् । भूत्यै जागरणम् । अभूत्यै स्वपनम् । तुलायै वाणिजम् । वणाय चिरणकारम् । विद्येभ्यो देवेभ्यः सिध्मलम् । पश्चादोषाय स्त्रीवम् [स्त्राविनं] । ऋत्यै जनवादिनम् । जूदाय अपगन्धम् । सङ्गराय प्रच्छिदम् ॥ १४ ॥

light, one who plays on the *talava* (a musical instrument, probably the archetype of the modern *tablá*), or one who produces music from his mouth ;*

150, To the divinity of gambling with the dice, a proficient gambler ; 151, to that of the Kríta age, a keeper of a gambling hall ; 152, to that of the Tretá age, a marker or reckoner at a gambling table ; 153, to that of the Dvápára age, one who is a spectator at a gambling ; 154, to that of the Kali age, one who does not leave a gambling hall even after the play has stopped ; 155, to that of difficult enterprises, a teacher of gymnastics on the top of a bamboo ; 156, to that of roads, a Brahmachári ; 157, to the Pisáchas, one who commits robberies on public highways and then hides himself in a mountain ; 158, to the goddess of thirst, one who skins cattle ; 159, to that of sin, a cattle-poisoner ; 160, to that of hunger, a cow-butcher ; 161, to the goddesses of hunger and thirst, one who lives by begging beef from a butcher ;†

162, To the divinity of land, a cripple who moves about on a crutch ; 163, to that of fire, a Chandála ; 164, to that of the sky, one whose profession is to dance on the top of a bamboo ; 165, to that of the celestial region, a bald person ; 166, to the presiding divinity of the sun, a green-eyed person ; 167, to the presiding divinity of the moon, one who twinkles his eyes too frequently ; 168, to the presiding divinity of the stars, one affected with white leprous blotches ; 169, to that of day, an albino with tawny eyes ; 170, to that of night, a black person with tawny eyes ;‡

171, To the goddess of speech, a fat person ; 172, to Váyu, the five vital airs : prána, apána, vyána, udána and samána, of that person ; 173, to Súrya should be immolated his eyes ; 174, to Chandramá his mind ; 175, to the regents of the quarters, his ears ; 176, his life, to Prajápati.§

* वसाय पु० खलूमालभते । वीणावादं गणकं गीताय । यादसे शबुल्यां । नर्माय भद्रवतीम् । तुणवधं प्रामण्यं पाणिसङ्गतं शृताय । मोदायानुक्रोशकम् । आनन्दाय तल्लवं ॥ १५ ॥

† अक्षराजाय कितवम् । कृताय सभाविनम् । [कृतायादिनवदर्शे] । चेताया आदिनवदर्शे [कल्पिनं] । दापराय वसिःसर्द । [अधिकल्पिनं] । कलये सभाभ्याणुम् । दुष्कृताय चरकाचार्यं । अध्वने ब्रह्मचारिणं । पिशाचेभ्यः शैलगं । पिपासायै गोवधं । निश्वस्यै गोघातं । चुधे गोविकर्भारम् । [योगां] । चुतृष्णाभ्यां तम् । यो मां विलुतं तं मा० सं भिक्षमाण उपतिष्ठते ॥ १६ ॥

‡ भूम्यै पीठसर्पिणमालभते । अग्नये अ० सलम् । वायवे चाण्डालम् । अनरिचाय व० शननिनम् । दिवे खलतिम् । सूर्याय चर्यचम् । चन्द्रमसे मिर्मिरं । नक्षत्रेभ्यः किलासम् । अङ्गे शुक्लं पिङ्गलम् । रात्रिये कृष्णं पिङ्गलम् ॥ १७ ॥

§ वाचे पु० पमालभते । प्राणमपानं आनमुदानं समानं तान् वायवे । सूर्याय चक्षुरालभते । मनश्चन्द्रमसे । दिग्भ्यः क्रोचं । प्रजापतये पु० पम् ॥ १८ ॥

177, Now to ugly divinities should be immolated very short, very tall, very lean, very fat, very white, very dark, very smooth, very hairy, few-toothed, numerously-toothed, frequently-twinkling-eyed, and very glaring-eyed, persons; 178, to the goddess for unattainable objects of hope, a woman who has passed the age for conception; 179, (and) to the goddess of hope for attainable objects, a virgin."*

In explanation of the purport of this long passage in the Taittiriya Bráhmaṇa, Āpastamba says: "The Purushamedha is pentadiurnal; a Bráhmaṇa or a Rájanya (Kshatriya) should celebrate it. He thereby acquires strength and vigour; he enjoys all fruition. (The number of) days should be as in the Panchasáradiya rite, and as a sequel to the Agnishtoma rite, eleven animals, meet for the Agnisomiya, should be tethered to eleven sacrificial posts, and, three oblations to Sávitri having been offered with the mantra *Deva savitastat savitur visváni deva savita &c.*, on the middle day they should be sacrificed (or consecrated *upákṛita*). Having sacrificed twice eleven men, reciting the mantra *Brahmaṇé Bráhmaṇán álabheta*, (the priest) places the sacrificed (or consecrated, *upákṛita*) victims between the sacrificial posts. The Brahmá (priest), then placing himself on the south side, recites the hymn to the great male Naráyana beginning with the verse *sahasra śírśa puruṣa*, &c., and, then turning a burning brand round the victims, consigns them to the north; (the other priests), then offering an oblation with clarified butter to the presiding divinity, place them (there)."

Sáyana Áchárya, after quoting this opinion of Āpastamba, and explaining the different terms used in the Bráhmaṇa to indicate the different gods and goddesses and the persons deemed meet for them, adds, "the human-formed animals beginning with Bráhmaṇa and ending with Virgin, are immolated (*álabdhavyáh*) along with the sacrificial animals on the middle day of the five days of this Purushamedha, which is a kind of Somayága."

* अथेतानऽरूपेभ्यः आलभते । अतिद्वलमतिदीर्घं । अतिह्रस्वमत्यलसलम् । अतिशुक्लमतिह्रस्वम् । अतिद्वलमतिह्रस्वम् । अतिकिरिटमतिदन्तरम् । अतिमिर्मिरमतिमेमिपम् । आशायै जामिम् । प्रतीक्षायै कुमारीम् ॥ १८ ॥

† तत्रापस्तम्ब आह । पञ्चाहः पुरुषमेधो ब्राह्मणो राजन्यो वा यजेत । ओजो वीर्यमाप्नोति, सर्वान्युष्टीर्यन्मुतः । एकादशसु यूपेष्वेकादशाग्नीषोमीयाः । पञ्चभारदीयवदहान्यग्निष्टोमो वोपोत्तमो देवसवितस्तत् सवितुर्विद्यानि देवसवितरिति तिस्रः सावित्रीर्जला मध्यमेऽहनि पशूनुपाकरोति । इयानैकादशिनानुपाकृत्य पुरुषान् ब्राह्मणे ब्राह्मणमालभेत इत्येतद् यथासमाम्नातं तान्यूपान्तराले धारयन्त्युपाकृतान् । दक्षिणतोऽवस्थाय ब्रह्मा सप्तसशीर्षाः पुरुष इति पुरुषेण नारायणेन पराचानुशंसति । पर्यग्निकृतानुदीचीनान् प्रोष्टवजत्याज्येन तदेवता आहुतीर्जला इयैरेकादशीनान् संस्थापयन्तीति ।

‡ ब्राह्मणादयः कुमार्यन्ताः प्रोक्ता मनुष्यविशेषरूपाः पशवोऽस्मिन् पुरुषमेधे पञ्चाहं सोमयागविशेषे मध्यमेऽहनि सवनीयपशुभिः समक्षित्यालभ्यन्ताः ।

Neither Āpastambha nor Sāyana has a word to say about the human victims being symbolical. The word used by Āpastambha is *Upākṛita*, which may mean consecration before a sacrifice or slaughter; and according to Jaimini, the highest authority on sacrifices, and his commentator Savara Svāmī, the sacrificial operations “of consecration, of bringing the animal to the place of sacrifice, fettering it, tying it to the post, slaughtering, and cutting the carcass open for the distribution of the flesh among the priests, are all implied when sacrifice is meant,” and the latter adds that “all the different acts should be understood when sacrifices are ordained, except when special instructions are given.”* Now no special exception has been made in the text about the human victims, and consequently the only conclusion to be arrived at is—that, the Taittirīyas did not look upon the rite as symbolical, though in the case of sacrifices under Nos. 172 to 176, the actual slaughtering of the airs, &c., would be rather awkward. It must be added, however, that Āpastambha is very brief and obscure in his remarks, and it would be hazardous to draw a positive conclusion from the insufficient data supplied by him, particularly as the Śatapatha Brāhmaṇa is positive on the subject of the human victims being let off after consecration; though the fact of that Brāhmaṇa being much later than the Taittirīya Brāhmaṇa, may justify the assumption that the practice of the Kāṇva school can be no guide to the followers of the Taittirīyaka.

The Śatapatha refers to the Purushamedha in several places; and the following is the full description of the rite given in it:

1. “Verily the great male, Nārāyaṇa, willed: ‘I shall abide over all living beings; verily I shall become all this (creation).’ He perceived this penta-diurnal sacrificial rite Purushamedha. He collected it. With it he performed a sacrifice. Performing a sacrifice with it, he abided over all living beings, and became all this (creation). He abides over all living beings and becomes all this, who performs a Purushamedha, as also he who knows all this.†

2. “Of that rite there are twenty-three initiations (*dikshā*), twelve benefactions (*upasada*), and five lustrations (*sutyā*), making altogether forty

* उपाकरणम् उवाचयनम् अचयावन्धो, यूपे नियोजनम् सङ्ग्रहणम् विशसनम् इत्येवमादयः । + + + + सवनीयस्य एते धर्माः भवेयुः । तुल्यः सर्वेषां पशुविधिः स्यात् । यदि प्रकरणे विशेषो न भवेत् । *Mimāṃsā Darsana* p. 373.

† पुरुषो ह नारायणोऽकामयत् । अतितिष्ठेयं सर्वानि भूतान्यहमेवेदं सर्वं स्यामिति । स एतं पुरुषमेधं पञ्चरात्रं यज्ञकृतमपश्यत्तमाहरत्तेनायजत् तेनेद्वात्यतिष्ठत् सर्वानि भूतानीदं सर्वमभवदतितिष्ठति सर्वानि भूतानीदं सर्वं भवति य एवं विद्वान् पुरुषमेधेन यजते यो वैतदेवं वेद ॥ १ ॥

members (*gātra*). The forty comprising the initiations, benefactions, &c., constitute the forty-syllabled *virāt*, (a form of metre) which assumes the form of Virāt (the first male produced by Prajāpati, and the father of mankind). Thus it is said; 'Virāt, the first or superior male, was produced.* This is the same Virāt. From this Virāt is produced the male for sacrifice.†

3. "Thereof these. There are four Daśats, and since there are four Daśats, they are the means for the attainment of the (different) regions and quarters (of the universe). This region (the earth) is the first to be attained by a Daśat; the upper region the second; the sky the third; the quarters the fourth. Thus verily the institutor of the sacrifice attains this region through the first Daśat, the region of ether through the second, the celestial region through the third, and the quarters through the fourth. Thus the Purushamedha is the means of attaining and subjugating all this—all these regions and all the quarters.‡

4. "For the initiation of this ceremony eleven animals meet for Agni and Soma, (should be procured). For them there should be eleven sacrificial posts (*Yūpa*). Eleven syllables are comprised in the Trishṭup metre; the Trishṭup is the thunderbolt,—it is vigour. With the thunderbolt and vigour of the Trishṭup the institutor of the sacrifice destroys all the sin before him.§

5. "In the rite of lustration there should be eleven victims. Eleven syllables are comprised in the Trishṭup metre; the Trishṭup is the thunderbolt,—it is vigour. With the thunderbolt and vigour of the Trishṭup the institutor of the sacrifice (*Yajamāna*) destroys the sin before him.||

6. "Because the victims (in this sacrifice) are eleven-fold, therefore verily is all this (creation) elevenfold. Prajāpati is eleven-fold; all this is

* A quotation from the Purushasūkta as given in the Vājasaneyi Saṁhitā.

† तस्य चयोविशतिर्दीक्षाः द्वादशोपसदः पञ्च सुत्याः स एष चत्वारिंशद्गावः सदी-
शोपसत्कश्चत्वारिंशदक्षरा विराट् तद्विराजमभिसम्पद्यते ततो विराडजायत विराजोऽ-
स्यधि पुरुष इत्येषा वै सा विराडेतस्या एवैतद्विराजो यज्ञं पुरुषं जनयति ॥ ९ ॥

‡ ता वाऽ एताः । चतस्रो दशतो भवन्ति तद्यदेताश्चतस्रो दशतो भवन्त्येषां चैव
लोकानामाग्नेः दिशां चैवमेव लोकं प्रथमया दशतामूर्ध्वन्नरिचं द्वितीयया दिवं तृतीयया
दिशश्चतुर्थ्या तथैवैतद् यजमान इममेव लोकं प्रथमया दशतामूर्ध्वन्नरिचं द्वितीयया दिवं
तृतीयया दिशश्चतुर्थ्या तावदाऽ इदं सर्वं यावदिमे च लोका दिशश्च सर्वं पुरुषमेधः
सर्वंस्याग्नेः सर्वंस्यावर्द्धे ॥ १० ॥

§ एकादशाग्निषोमीयाः पञ्चव उपवस्ये । तेषां समानं कर्मकादश यूपा एकादशा-
क्षरा विष्टुव्वक्षिष्टुव्वीर्यं विष्टुव्वक्षेनैवेतत् वीर्येण यजमानः पुरस्तात् पाप्मानमपहते ॥ ४ ॥

|| एकादशिनाः सुत्यास्तु पञ्चवो भवन्ति । एकादशाक्षरा विष्टुव् वक्षिष्टुव् वीर्यं
विष्टुव् वक्षेणैवेतद् वीर्येण यजमानः पुरस्तात् पाप्मानमपहते ॥ ५ ॥

verily Prajāpati; all this is the Purushamedha, which is the means for the attainment and subjugation of all this.*

7. "That Purushamedha is verily penta-diurnal, and the greatest rite of sacrifice. Fivefold is Yajña; fivefold are victims or sacrificial animals; five are the seasons included in the year. Whatever is fivefold in celestial or spiritual matter, the same may be obtained through this (rite).†

8. "Thereof the Agnishtoma is the first day; next the Ukthya; the next Atirātra; the next Ukthya; the next Agnishtoma: thus it is hedged on either side with the Ukthya and the Agnishtoma.‡

9. "Yavamadhya are these five nights, (that is like a barley corn stoutest in the middle and tapering on either side, meaning that the most important day is in the middle; or, as the commentator has it, the penance of gradually reducing the food and then again gradually increasing it, should be observed, so that on the third night there should be the smallest allowance of food). These regions are verily the Purushamedha; these regions have light on either side,—Agni on this (side), and the sun on the other (side). In the same way it (the Purushamedha) has, on either side, the food of light and the Ukthya. The soul is Atirātra; and since the Atirātra is hedged in on both sides with the two Ukthyas, therefore is the soul nourished by food. And since the thriving Atirātra, is placed in the middle day, therefore is it Yavamadhya. He who engages in this rite has none to envy him, or to grow inimical to him. He who knows this suffers not from envy or enmity.§

10. "Of that Purushamedha this region is the first day. Of this region the spring season (is the chief). That which is above this region, the etherial region, (*antariksha*.) is the second day; of that the summer is the season. The etherial region is its third day. Of the etherial region the rainy and the autumn are the seasons. That which is above the etherial region, the sky, (*Diva*.) is the fourth day; of it the dewy is the season. The heaven is its

* यदेवैकादशना भवन्ति । एकादशिनी वाऽ इदं सर्वं प्रजापतिर्द्वाकादशिनी सर्वं हि प्रजापतिः सर्वं पुरुषमेधः सर्वस्याग्निः सर्वस्यावबद्धौ ॥ ६ ॥

† स वाऽ एष पुरुषमेधः पञ्चरात्रो यज्ञक्रतुर्भवति । पाङ्क्तो यज्ञः पाङ्क्तः पशुः पञ्चर्तवः संवत्सरो यत्किञ्च पञ्चविधमधिदेवतमध्याह्नं तदेनेन सर्वमाप्नोति ॥ ७ ॥

‡ तस्याग्निष्टोमः प्रथममहर्भवति । अथोक्थ्याऽथातिरात्रोऽथोक्थ्याऽथाग्निष्टोमः स वाऽ एष उभयतोऽप्यतिरुभयतउक्थ्याः ॥ ८ ॥

§ यवमध्यः पञ्चरात्रो भवति । इमे वै लोकाः पुरुषमेध उभयतोऽप्यतिथो वाऽ इम लोका अग्निनेत आदित्येनामुतसुखादुभयतोऽप्यतिरुभयतउक्थ्या आत्मातिरात्रस्तद् यदेतऽ उक्थ्यावतिरात्रमभितो भवतसुखादयमात्माग्नेन परिहृष्टोऽय यदेव वर्षिष्टोऽतिरात्रोऽह्ना स मध्ये तस्माद्यवमध्यो युते च वै द्विपन्नं भालयमयमेवास्ति नास्य द्विपन्नं भालय इत्याह्वयं एक वेद ॥ ९ ॥

fifth day ; of that heaven the winter is the season. This much is the celestial account of the Purushamedha.*

11. " Now for its spiritual relations. Initiation (*Pratishthā*) is its first day. Initiation is the spring season. That which is above it and below the middle is the second day ; of that the summer is the season. The middle is the middle day. Of the middle day the rainy and the autumn are the seasons. That which is above the middle day and below the head or last day is the fourth day ; thereof the dewy is the reason. That which is the head is the fifth day ; the season of this head is the winter. Thus verily these regions, the year, and the soul constitute the Purushamedha. All these regions, the whole year, the whole soul, the whole Purushamedha are for the attainment and subjugation of every thing.†

(Section 2.) 1. Now, whence the name Purushamedha ? These regions verily are *Pur*, and He, the Purusha, who sanctifies this (*Pur*) sleeps (*sete*) in this abode (*Puri*) and hence is he named Purusha (*Puri* and *sete* = Purusha). To him belongs whatever food exists in these regions ; that food is (called) *medha* ; and since his food is *medha*, therefore is this Purushamedha. Now since in this (rite) purified males are sacrificed (*ālabhate*), therefore verily is this a Purushamedha.‡

2. These (males) verily are sacrificed (*ālabhate*) on the middle day. The etherial region is the middle day ; the etherial region is verily the abiding place of all living beings. These animals are verily food ; the middle day is the belly, and in that belly is that food deposited.§

* तस्यायमेव लोकः प्रथममहः । अयमस्य लोको वसन्त ऋतुर्यदूर्द्धमस्मात्लोकोऽदवा-
चीनमन्तरिक्षात्तद् द्वितीयमहस्तदस्य मीमा ऋतुर्मध्यमेवास्य मध्यममहर्मध्यमस्य वर्षाशरदा-
ष्टत् यदूर्द्धमन्तरिक्षादवाचीनं दिवस्तच्चतुर्थमहस्तदस्य हेमन्त ऋतुर्द्वारेवास्य
पञ्चममहर्द्वारस्य शिशिर ऋतुरित्यग्निदेवतं ॥ १० ॥

† अथाध्यात्मं । प्रतिष्ठैवास्य प्रथममहः प्रतिष्ठोऽस्य वसन्त ऋतुर्यदूर्द्धं प्रतिष्ठाया
अवाचीनं मध्यात्तद् द्वितीयमहस्तदस्य मीमा ऋतुर्मध्यमेवास्य मध्यममहर्मध्यमस्य वर्षाशरदा-
ष्टत् यदूर्द्धं मध्यादवाचीनं शीर्ष्मस्तच्चतुर्थमहस्तदस्य हेमन्त ऋतुः शिर एवास्य पञ्चममहः
शिरोऽस्य शिशिर ऋतुरेवमिमे च लोकाः संवत्सरस्यात्मा च पुरुषमेधमभिसम्पद्यन्ते सर्व्यं वाऽ
इमे लोकाः सर्व्यं संवत्सरः सर्व्यमात्मा सर्व्यं पुरुषमेधः सर्व्यस्याग्नेः सर्व्यस्यावशब्दे ॥ १ ॥
ब्राह्मणं ॥ [६. १.] ॥

‡ अथ यस्मान् पुरुषमेधो नाम । इमे वै लोकाः पूरयमेव पुरुषो योऽयं पवते सोऽस्यां
पुरि भेते तस्मान् पुरुषस्तस्य यदेषु लोकेष्वन्नं तदस्यान्नं मेधस्तद्यदस्यैतदन्नं मेधस्तस्मात् पुरुष-
मेधोऽथो यदस्मिन् मेध्यान् पुरुषानालभते तस्मादेव पुरुषमेधः ॥ १ ॥

§ तान् वै मध्यमेऽहन्नालभते । अन्तरिक्षं वै मध्यममहर्नरिक्षमु वै सर्व्येषां भूताना-
मायतनमथोऽन्नं वाऽ एते पश्य उदरं मध्यममहर्दरे तदन्नं दधाति ॥ १ ॥

3. They are sacrificed by ten and ten. Ten syllables are comprised in (each foot of) the Virát, (metre) ; the Virát is complete food, for the attainment of complete food.*

4. Eleven tens are sacrificed. Eleven syllables are comprised in the Trishtup (metre) ; the Trishtup is the thunderbolt,—it is vigour. With the thunderbolt and vigour of the Trishtup, the institutor of the sacrifice destroys the sin within him (lit. in the middle).†

5. "Forty-eight (animals) are sacrificed at the middle post. Forty-eight syllables are comprised in the Jagati (metre) ; the animals belong to the Jagati (metre) ; by the Jagati are animals bestowed on the Yajamána.‡

6. "Eleven eleven at the other (posts). Eleven syllables are comprised in the Trishtup ; the Trishtup is the thunderbolt,—it is vigour. With the thunderbolt and vigour of the Trishtup should the institutor of the sacrifice destroy the sin around him.§

7. "Eight best ones are sacrificed. Eight syllables are comprised in the Gáyatri (metre). The Gáyatri is Brahma. That Brahma consummates the well-being of all this. Therefore is Brahma said to be the best of all this.||

8. "They (the sacrificial animals) belong to Prajapati. Brahma is Prajapati ; Prajapati belongs to Brahma ; therefore do they (the animals) belong to Prajapati.¶

9. "He (Prajapati, i. e. Brahma, here meaning the priest so named) having sanctified the animals, offers, for the gratification of Savitá, three oblations with the Sávitrí verses beginning with, *Deva savitus tatsavitur*, &c. He (Savitá), gratified thereby, produces these men, therefore are these men sacrificed.**

* तान् वे दश दशलभते । दशाचरा विराट्परादु क्त्वा मन्त्रं क्त्वा ज्यैवाश्वस्य-
वस्ये ॥ २ ॥

† एकादश दशत आलभते । एकादशाचरा विष्टुर्वच्चजिष्टुर्वीर्यं विष्टुर्वच-
क्षैवैतद् वीर्येण यजमानो मध्यतः पाप्मानमपहते ॥ ४ ॥

‡ अष्टाचत्वारिंशत् मध्यमे यूपः आलभते । अष्टाचत्वारिंशदचरा जगती जागताः
पशवो जगत्यैवाश्वैः पशून्वस्ये ॥ ५ ॥

§ एकादशैकादशेतरेषु । एकादशाचरा विष्टुर्वच्चजिष्टुर्वीर्यं विष्टुर्वचक्षैवैतद्
वीर्येण यजमानोऽभितः पाप्मानमपहते ॥ ६ ॥

|| अष्टाः उत्तमानालभते । अष्टाचरा गायत्री ब्रह्मगायत्री तद् ब्रह्मैवैतदस्य सर्वस्योत्तमं
करोति तस्माद् ब्रह्मास्य सर्वस्योत्तममित्याहुः ॥ ७ ॥

¶ ते वै प्राजापत्या भवन्ति । ब्रह्म वै प्रजापतिर्ब्राह्मो हि प्रजापतिस्तस्मात् प्राजापत्या
भवन्ति ॥ ८ ॥

** स वै पशून्पाकरिष्यन् । एतास्त्रिषुः सावित्रीराजतीर्जुरोति देव सवितस्तत्सवितु-
र्वरेण्यं विश्वानि देव सवितरिति तवितारं प्रीणाति सोऽश्वैः प्रीत एतान् पशून् प्रमौति तेन
प्रसूतानालभते ॥ ९ ॥

10. "A Bráhmaṇa is sacrificed to Brahma.* Brahma is verily Bráhmaṇa; Brahma thrives through Bráhmaṇa. To the Kshatriya (divinity) a (person of the) Rájanya (caste), (should be sacrificed). The Kshatriya is verily Rájanya. The Kshatra thrives through a Kshatra. To the Maruts a Vaiśya (should be sacrificed). The Viśa is the Maruts. The Viśas thrive through the Viśas. To Tapas (the presiding divinity of penances), a Súdra (should be sacrificed). Tapas is verily Súdra. Tapas thrives through Tapases (works of penance). Even as these gods thrive through these animals (victims), so do they, thriving, cause the institutor of the sacrifice to thrive in all his wishes.†

11. "Offers oblation with butter. The butter is verily vigour. Through that vigour, vigour is given to this (institutor of the sacrifice). Offerings are given with butter, which is the gods' most favourite glory; and since butter promotes their favourite glory, they, thriving, cause the institutor of the sacrifice to thrive in all his wishes.‡

12. "The persons appointed. The Brahmá, from the south, praises the great male Náráyana, with the sixteen Rig verses beginning with *Sahas-sraśirsha* &c. (the Purushasukta), for verily the whole of the Purushamedha is sixteen membered for the attainment of everything, and for the subjugation of everything; and he is praised with the words, "thus thou art, thus thou art." In this way he is worshipped for certain. Now, as it is, this is said about it, the animals are consecrated by turning a flaming brand round them, but left unslaughtered," (*asañjñaptáh*) § [Kátyáyana explains that the Bráhmaṇas &c., are let loose, like the *Kapiñjala* bird in the Aśvamedha sacrifice.—*Kapinjáládi-vadutsrijanti Bráhmaṇádín*; and his commentator adds, "after a flaming brand has been turned round them:" *paryagnikritanutsrijantityarthah*.]

* A quotation from the Sañhitá.

† ब्रह्मणे ब्राह्मणमालभते । ब्रह्म वै ब्राह्मणो ब्रह्मेव तद् ब्रह्मणा समर्धयति क्षत्राय राजन्यं क्षत्रं वै राजन्यः क्षत्रमेव तत् क्षत्रेण समर्धयति मरुद्भ्यो वैश्यं विशो वै मरुतो विशमेव तद्विशो समर्धयति तपसे शुद्रं तपो वै शुद्रस्तप एव तत्तपसा समर्धयत्येवमेता देवता यथारूपं पशुभिः समर्धयति ता एनं समृद्धाः समर्धयन्ति सर्व्वः कामैः ॥ १० ॥

‡ आग्नेन जुहोति । तेजो वाऽ आग्नें तेजसैवाग्निंस्ततेजो दधात्याग्नेन जुहोत्येतद्दे देवानां प्रियं धाम यदाग्नें प्रियेणैवैनां धाम्ना समर्धयति तऽ एनं समृद्धाः समर्धयन्ति सर्व्वः कामैः ॥ ११ ॥

§ नियुक्तान् पुरुषान् । ब्रह्मा दक्षिणतः पुरुषेण नारायणेनाभिष्टौति सृष्टसशीर्षा पुरुषः सृष्टसाक्षः सृष्टसपादित्येतेन षोडशर्चेन षोडशकलं वाऽ इदं सर्व्वं सर्व्वं पुरुषमेधः सर्व्वस्याग्नेऽ सर्व्वस्यावरुद्धाऽ इत्यमसीत्यमसीत्युपकौत्येवैनमेतन् सृष्टयत्येवाथो यथैष तथैनमेतदाह तत् पर्य्यगृह्णतः पशवा भूवुरसृष्टाः ॥ १२ ॥

13. "About this ; speech (*vák*) uttered this ; 'O male, grieve not if you remain here ; a male will eat a male.' Thus, those who had the flaming brand turned round them, were let loose, oblations of butter were offered to the several divinities ; and thereby were the divinities gratified ; and thus gratified they conferred all blessings on the worshipper."* [Three oblations are offered to each of the divinities, naming each, and followed by the word *sváhá*].

14. "He offers oblations with butter. Butter is vigour ; by that vigour verily vigour abides in this (worshipper, *Yajamāna*).†

15. "(This rite) is established (for the worshipper, *Yajamāna*) by the eleven (animals). Eleven-syllabled is the *Trishṭup*. The *Trishṭup* is the thunderbolt,—it is vigour. Through the thunderbolt and vigour of the *Trishṭup*, the *Yajamāna* destroys the sin within him.‡

16. "Abiding in the ceremony of *Udayaniyá*." (Vide *Āśvaláyana Sūtra* IV, 3. *Kátyáyana* VII, 1, 16.) "Eleven barren cows, such as are meet for *Mitra*, *Varuṇa* the *Viśvedevas*, and *Brihaspati* should be sacrificed (*álabhate*) for the attainment of these deities, and since those for *Brihaspati* are the last, *Brihaspati* is the same with *Brahma*, and therefore the *Yajamāna* ultimately abides in *Brahma*."§ [*Kátyáyana* explains that three cows are to be slaughtered to *Mitra* and *Varuṇa*, three to the *Viśvedevás*, and five to *Brihaspati*].

17. "Now why are there eleven ? Eleven-syllabled is the *Trishṭup*. The *Trishṭup* is the thunderbolt,—it is vigour. By the thunderbolt and vigour of the *Trishṭup*, the *Yajmāna* destroys the sin within him. Threefold is the ceremony of *Udavasániya* ; "(*Aitareya Bráhmaṇa* 8, 8,)" it is a friend of the *Yajamāna*.||

18. "Now for the fees (*dakṣhiṇá*). (Wealth acquired) from [a conquered] country, excluding land, and wealth taken from *Bráhmaṇas*, but including men (slaves). (Wealth from) the eastern side (of the king-

* अथ चेन वागभ्युवाद । पुरुष मा सन्निष्ठिपो यदि संस्थापयिष्यसि पुरुष एव पुरुष-
मव्यतीति तान् पर्यगृह्णतानेवादष्टजतदेवत्या आडतीरजुहोताभिस्ता देवता अप्रीणाता
एनं प्रीता अप्रीणन् सर्वैः कामैः ॥ १२ ॥

† आग्नेन जुहोति । तेजो वाऽ आर्जं तेजसेवाग्निंस्तेजो दधाति ॥ १४ ॥

‡ एकादशिनैः संस्थापयति । एकादशाक्षरा विष्टुव् वक्षस्त्रिष्टुव् वीर्यं विष्टुव् वक्ष्णे-
वैतद्दीर्येण यजमानो मध्यतः पाप्मानमपहते ॥ १५ ॥

§ उदयनीयायां संस्त्रितायां । एकादश वशा अनुबन्धा आलभते मैवावरणीर्वैश्व-
देवीर्वाहस्यत्या एतासां देवतानामाग्ने तद्यद्वाहस्यत्या अन्या भवन्ति ब्रह्म वै दृढस्यतिसादु
ब्रह्मण्येवान्ततः प्रतितिष्ठति ॥ १६ ॥

|| अथ यदेकादश भवन्ति एकादशाक्षरा विष्टुव् वक्षस्त्रिष्टुव् वीर्यं विष्टुव् वक्ष्णेवैत-
द्दीर्येण यजमानो मध्यतः पाप्मानमपहते वैधातयुदवसानीयासावेव बन्धः ॥ १७ ॥

dom), along with slaves (should be given) to the Hotá (or reciter of Rig mantras). (Wealth from) the southern side (with slaves) to the Bráhmaṇa, (the director) ; (wealth from) the western side (with slaves) to the Adhvaryu (Yajur Vedic priest) ; (wealth from) the northern side (with slaves) to the Udgátá (or singer of the Sáma hymns), and according to their dues to the Hotrikas, (or junior priests).”*

[This verse is very elliptical and obscure, and translating without the aid of a commentary, I am doubtful about its exact construction. The ellipses have been supplied from the Sútras of Kátyáyana.]

19. “Now if a Bráhmaṇa performs the ceremony he should give (all his property) to the most learned. The Bráhmaṇa includes everything ; the knower of every thing is included in everything ; the Purushamedha includes everything, (and it is) for the attainment and subjugation of everything.†

20. “Now, keeping to himself only his own self, and his (household) fire, and after praising the sun with the Uttara Náráyana hymn, looking at nothing, he should retire to a forest ; thereby he separates himself from mankind. If he should like to dwell in a village, he should produce a fire by the rubbing of two sticks, and, praising Áditya with the Uttara Náráyana hymn, return home, and there continue to perform the rites he was used to, and which he is able to perform. He verily should not speak with every body ; to him the Purushamedha is everything, and therefore he should not speak to all (kinds of persons) ; to those only whom he knows, who are learned, and who are dear to him he may speak ; but not to all.”‡

No one, I fancy, will deny that the sacrifice described above clearly shows that it is a modification of a prior rite in which the human victims wholly or in part were immolated. No other theory can satisfactorily account for its peculiar character, and the way in which it justifies itself. Probably the number originally sacrificed was few, and that when the rite became emblematic, the number was increased in confirmation of some liturgical theory, particularly as it did not involve any trouble or difficulty.

* अथातो दक्षिणानां । मध्यं प्रति राष्ट्रस्य यदन्यद्भूमेऽथ ब्राह्मणस्य च वित्तात् सपुत्रं प्राची दिग्घातुर्दक्षिणा ब्रह्मणः प्रतीत्यध्वर्योऽदीक्षुद्गातुस्तदेव ङाडका अन्वाभक्ताः ॥ १८ ॥

† अथ यदि ब्राह्मणो यजेत । सर्व्ववेदसं दद्यात् सर्व्वं वै ब्राह्मणः सर्व्वं सर्व्ववेदसं सर्व्वं पुरुषमेधः सर्व्वस्याग्नेः सर्व्वस्यावस्ये ॥ १९ ॥

‡ अथात्तदग्री समारोह्य । उत्तरनारायणेनादित्यमुपस्थायानपेक्षमाणोऽरण्यमभि-
प्रेषात् तदेव मनुष्येभ्यस्त्रिणो भवति यद्यु ग्रामे विवस्तेदरण्येऽग्री समारोह्योत्तरनारायणेनै-
वादित्यमुपस्थाय मृच्छेत् प्रत्यवस्येदथ तान् यज्ञक्रतूनाहरेत यानभ्यामुयात् स वाऽएव न
सर्व्वस्याऽअनुवक्तव्यः सर्व्वं हि पुरुषमेधो नेत्यवस्थाऽएव सर्व्वं ब्रवाणीति यो न्येव ज्ञातस्तस्मै
ब्रूयादथ योऽनूचानोऽथ योऽस्य प्रियः स्याद्वेत्तेव सर्व्वस्याऽएव ॥ २० ॥ ब्राह्मणम् । १॥ [६. १.] ॥
षष्ठोऽध्यायः [८९.] ॥

But whether so or not, certain it is that at one time or other men were immolated for the gratification of some divinity or other in this rite or its prototype. The question then arises, was it the case before the date of the Rík Sañhitá, or after it?

The interval between the date of the Śatapatha Bráhmaṇa and the Sañhitá of the Ríg Veda is estimated by the learned Professor Max Müller at about six and seven hundred years, and the question being, when was the sacrifice real which became emblematic in the time of the Śatapatha? it would require more confidence in one's power of conjecture than I can pretend to, to say that it must have been before the time of the Sañhitá, and not after it. National rites, customs, and ceremonies are, doubtless, very tenacious of life, but in primitive times, in the infancy and early youth of society, the characteristics of social life changed much more rapidly than in later times; certain it is, that the social condition of the Indo-Aryans and their rites and ceremonies underwent radical and most extensive changes during the interval between the Rík Sañhitá and the Śatapatha Bráhmaṇa, and there is literally not an iota of evidence to show that the rite of Purushamedha was left unaltered for the whole period. Seeing that the Bráhmaṇa depends solely on the Sañhitá for scriptural authority, and adapts the, to us, indistinct and vague generalities of the original, for the developement of a new cultus, modifying and changing details to suit its own views, the presumption becomes strong that the real sacrifice belonged to the Sañhitá, and the Bráhmaṇa divested it of its hideousness and cruelty, and made it emblematic, even as the Vaishṇavas have, within the last five or six hundred years, replaced the sacrifice of goats and buffaloes to Chaṇḍiká by that of pumpkins and sugarcane.

Nor is the Purushamedha the only sacrifice at which human sacrifices were ordained. The Áśvamedha, or horse sacrifice, required the immolation of a human being just as much as the former, and hence it is that the horse sacrifice was prohibited in the Kali Yuga along with it. The Taittiríya Bráhmaṇa of the Black Yajur Veda gives the following story on the subject: "Prajápati, having created all living beings, through affection entered within them. But afterwards he could not get out of them. He said, 'Whoever will extricate me from this confinement will become wealthy.' The Devas performed an Áśvamedha and thereby extricated him; thus they became wealthy. Whoever performs an Áśvamedha attains profusion of wealth by extricating Prajapati."*

* प्रजापतिः प्रजाः सृष्ट्वा प्रेक्षानुप्राविशन् । ताभ्यः पुनः सम्भवितुं नाशक्नोत् । सोऽब्रवीत् । अश्वं वदितुः । यो मेतः पुनः सम्भरदिति । तन्मेवाश्वमेधेनैव सम्भरन् । ततो वै तं चार्ध्वन् । योऽश्वमेधेन यजते । प्रजापतिमेव सम्भरन् संप्रोति ।

The object of this story is to point out the necessity of slaughtering one hundred and eighty animals of different kinds at this sacrifice to liberate Prajápati from his confinement, and the first victim ordained is a man. "He (the institutor of the sacrifice) immolates a man; (the form of) a man is (like that of) Virát, the type of the animated creation. By the immolation of the man is Virát immolated. Now Virát is food, and therefore through Virát food is obtained."* The horse, the cow, the goat and other animals are ordained to be immolated in almost the same words; everywhere using the verb *álabhate*. The details of the Áśvamedha would require more space than what I can spare here, so I must reserve them for a separate paper.

Apart from the Purushamedha and the Áśvamedha, the Śatapatha Bráhmaṇa, in adverting to the offering of animal sacrifice generally, and enumerating separately the horse, the cow, the goat, &c., has a verse which is remarkable for the manner in which a human victim is therein referred to. It says "Let a fire-offering be made with the head of a man. The offering is the rite itself (*yajña*); therefore does it make a man a part of the sacrificial animals; and hence it is that among animals man is included as a sacrifice. Whoever offers an oblation with the head, to him the head gives vigour."† The commentator explains that by the term *puruṣa śírśa* "man's head", a man is understood, a part being, by a figure of speech, taken as equivalent to the whole.

Passing from the Bráhmaṇas to the Itihásas, we have ample evidence to show that the rite of Purushamedha was not unknown to their authors. The Institutes of Manu affords the same evidence, but it would seem that when it came into currency, the rite was looked upon with horror, and so it was prohibited as unfit to be performed in the present age. The Puráṇas followed the Institutes, and the prohibition included along with it the Áśvamedha, suicide by drowning one's self in the sea, procreation of children on an elder brother's widow, and a variety of other reprehensible and odious rites, ceremonies and customs,‡ showing clearly that the rite originally was not so innocent as the supposition of its being emblematic would make it; for had the offering been limited to the mere repetition of a few mantras

* पुरुषमालभते । विराजो वै पुरुषः । विराजमेवालभते । अथो अन्नं वै विराट् अन्नमेवावरुन्ते ।

† अथ पुरुषशीर्षमभिजुहोति । आहुतिर्वै यज्ञः पुरुषं तत्पशूनां यज्ञियं करोति तस्मान् पुरुष एव पशूनां यजते । यदेवैनदभिजुहोति । शीर्षं लक्ष्मीं दधाति ।

‡ Beef in Ancient India, ante XLI, p. 194.

over a certain number of men, it would not have been so obnoxious to Hindu feeling as to necessitate its suppression.

But while the Puráṇas suppressed the Purushamedha, they afford abundant indications of another rite requiring the immolation of a human victim having come into vogue. This was *Narabali*, or human sacrifice to the goddess Chámuṇḍá, or Chaṇḍiká,—a dark, fierce, sanguinary divinity, who is represented in the most awful forms, not unoften dressed in human palms, garlanded with a string of human skulls, holding a skull by the hair in one hand, and an uplifted sabre in the other, and having her person stained with patches of human gore. European orientalists assign a very modern date to the Puráṇas, and also to the Tantras which describe the cultus of this divinity; but poems and dramatic works dating from eight to fifteen hundred years ago refer to her and her predilection for human sacrifices, and lithic representations of her form of early mediæval ages are still extant. It has also been proved by unquestionable evidence that most of the leading Tantras of the Hindus were translated into Tibetan from the seventh to the ninth century of the Christian era, and thereby the worship of that goddess naturalised on the other side of the Himálaya.* It must follow that the Hindu Tantras existed for some time before the 7th century, and then the rite of *Narabali* was known and practised by the people of this country. How long before that period the rite was known, I shall not attempt to determine, for data for such a determination are not available; but the theory of interpolation apart, the goddess is mentioned in the Rámáyana as reigning in the nether regions; and her type, as I have already stated, is to be found in Artymis, and even among Assyrian records, and she cannot, therefore, reasonably be taken to be so modern as is generally supposed.

The Káliká Puráṇa is in ecstacy on the merits of the disgusting rite. It says, "By a human sacrifice attended by the forms laid down, Deví remains gratified for a thousand years, and by a sacrifice of three men one hundred thousand years. By human flesh the goddess Kámákhyá's consort Bhairava, who assumes my shape, remains pleased for three thousand years. Blood consecrated, immediately becomes ambrosia, and since the head and flesh are gratifying, therefore should the head and flesh be offered at the worship of the goddess. The wise should also add the flesh free from hair, among food offerings."† The Puráṇa then enters into minute details about the ways

* Csoma de Kőrösi, in the Asiatic Researches, (XX, pp. 569 ff.) gives a long list of Buddhist Tantras.

† नरेण बलिना देवि सहस्रं परिवत्सरान् ।
विधिदत्तेन चाप्नोति बलिं स्रष्टुं विभिन्नैरेः ॥
नारेणैवाथ मासेन त्रिसहस्राणि च वत्सरान् ।
बलिं प्राप्नोति कामाख्याभैरवो मम रूपदृक् ॥

114 Rájendralāla Mitra—*On Human Sacrifices in Ancient India*. [No. 1, in which, the times when, and the places where, the rite should be celebrated ; but as the whole of the chapter in which the details occur, has been already published,* I shall confine myself here to a short extract from another chapter to give an idea of the ceremony connected with the Durgá Pújá.

After describing the ritual of the Durgá Pújá, that Purāṇa continues—"Next should be performed such sacrifice as is gratifying to the Devī. The elephant-headed (Gaṇeśa) should be gratified with sweetmeats ; Hari with clarified butter, (*Havis*, the word may be rendered into rice, fruits, &c.) ; the all-destroying Hara, with the threefold entertainment, (of dancing, singing and music) ; but the worshipper should always gratify Chāṇḍiká with animal sacrifice. Birds, tortoises, crocodiles, hogs, goats, buffaloes, guanos, porcupines, and the nine kinds of deer, yaks, black antelopes, crows, lions, fishes, the blood of one's own body, and camels are the sacrificial animals. In the absence of these sometimes horses and elephants. Goats, sarabha, (a young elephant, or a fabulous animal with eight legs,) and human beings in the order in which they are named, are respectively called *Bali*, (sacrifice) *Mahábali*, (the great sacrifice,) and *Atibali* (highest sacrifice). Having placed the victim before the goddess, the worshipper should adore her by offering flowers, sandal paste, and bark, frequently repeating the mantra appropriate for sacrifice. Then, facing the north and placing the victim so as to face the East, he should look backward and repeat this mantra : 'O man, through my good fortune thou hast appeared as a victim ; therefore I salute thee ; thou multiform, and of the form of a victim. Thou, by gratifying Chāṇḍiká destroyeth all evil incidents to the giver. Thou, a victim, who appeareth as a sacrifice meet for the Vaishṇavī, havest my salutations. Victims were created by the self-born himself for sacrificial rites ; I shall slaughter thee to-day, and slaughter at a sacrifice is no murder.'—Then meditating on that human-formed victim a flower should be thrown on the top of its head with the mantra 'Om, Aiñ, Hriñ, Sriñ'. Then, thinking of one's own wishes, and referring to the goddess, water should be sprinkled on the victim. Thereafter, the sword should be consecrated with the mantra, 'O sword, thou art the tongue of Chāṇḍiká, and bestower of the region of the gods, Om, Aiñ, Hriñ, Sriñ. Black, and holding the trident, (thou art) like the last dreadful night of creation ; born fierce, of bloody eyes and mouth, wear-

मन्त्रपूर्तं शेषितं पीयूषं जायते सदा ।

मस्तकश्चापि तस्यापि मांसमिष्टमिदं यतः ॥

तस्मात् तत्पूजने दद्याद् बलेः शीर्षं च शेषितं ।

भोज्ये निर्लेहमांसानि नियुक्तीयाद् विचक्षणः

इति कालिकापुराणे बलिनिर्णयपर्वे सप्तपठितमोऽध्यायः ॥

* Blacquire, Asiatic Researches, vol. V. pp. 371 ff.

ing a blood-red garland, and equally sanguinary unguents (on thy person), arrayed in blood-red garment, and holding a noose, master of a family, drinking blood, and munching heaps of flesh, thou art *Asi*, (that which eats away the head of its victim); thou art *Vikāsana*, (the drier up of its victim); thou art *Khadga*, (that which tears up); thou art *Tikṣṇadhāra* (keen-edged); thou art *Durāsada*, (the giver of difficultly attainable objects); thou art *Srīgarbha* (the womb of prosperity); thou art *Vijaya* (victory); thou art *Dharmapāla*, (protector of the faith); salutations be to thee. 'The sword' having been thus consecrated, should be taken up while repeating the mantra '*ĀṢ HŪṢ PHAT*,' and the excellent victim slaughtered with it. Thereafter, carefully sprinkling on the blood of the victim, water, rock-salt, honey, aromatics, and flowers, it should be placed before the goddess, and the skull also with a lamp burning over it should be placed before her with the mantra, 'Om, Aiñ, Hriñ, Sriñ, Kausiki, thou art gratified with the blood.' Thus having completed the sacrifice, the worshipper attains rich reward."*

* श्रीभगवानुवाच । बलिदानं ततः पश्चात् कुर्यादेव्याः प्रमोदकं ।

मोदकैर्गजवक्त्रैश्च चविषा तोषयेद्धरिं ॥

तैर्यविकैश्च नियमैः शङ्करं तोषयेद्धरं ।

चण्डिकां बलिदानेन तोषयेत् साधकः सदा ॥

पत्तिणः कच्छपपादा वराहाच्छागलास्तथा ।

महिषो गोधिका शालस्तथा नवविधा खगाः ॥

चामरः छण्णसारथ्य यमः पञ्चाननस्तथा ।

मत्स्याः खगाश्चरुधिरं चोष्टृका बल्लयो मताः ॥

अभावे च तथैवैषां कदाचिद्वयचलिनौ ।

कागलः सरभश्चैव नरश्चैव यथाक्रमान् ॥

बलिर्महाबलिरतिबलयः परिकीर्तिताः ।

स्थापयित्वा बलिनव पुष्पचन्दनवल्कलैः ॥

पूजयेत् साधको देवो बलिमन्त्रैर्मुञ्जमुञ्जः ।

उत्तराभिमुखो भूत्वा बलिं पूर्वमुखस्तथा ॥

निरीक्ष्य साधकः पश्चादिमं मन्त्रमुदीरयेत् ।

नरस्त्वं बलिरूपेण मम भाग्यादुपस्थितः ।

प्रणमामि ततः सर्वरूपिणं बलिरूपिणं ॥

चण्डिकाप्रीतिदानेन दातुरापद्मिनाग्निने ।

वैष्णवीबलिरूपाय बले तुभ्यं नमोऽस्तु ते ॥

यज्ञार्थे बलयः हृष्टाः स्वयमेव स्वयम्भवा ।

अतस्त्वां घातयाम्यस्य तस्माद् यज्ञे रक्षोऽवधः ॥

It is not necessary for me to swell the bulk of this paper, already more swollen than what I at first intended to make it, by collecting notes of all the places where, and the occasions when, the rite of Narabali was performed, in order to show how widespread was the practice during the middle ages and modern times. Ward has given several instances of its occurrence in Bengal in his elaborate dissertation on the Hindus. The fact is well known that for a long time the rite was common all over Hindustan; and persons are not wanting who suspect that there are still nooks and corners in India where human victims are occasionally slaughtered for the gratification of the Devi. In old families which belong to the sect of the Vámá-cháris and whose ancestors formerly offered human victims at the Durgá and the Káli pújás, a practice still obtains of sacrificing an effigy, in lieu of a living man. The effigy, a foot long, is made of dried milk (*khíra*), and sacrificed according to the formula laid down in the Káliká Purána, the only addition being a few mantras designed typically to vivify the image. A friend of mine, Bábu Hemchunder Ker, Deputy Magistrate of Twenty-four Pergunnahs and author of an excellent work on the culture of Jute in Bengal, informs me

ॐ ऐं ह्रीं श्रीं इति मन्त्रेण तं बलिं नररूपिणं ।
चिन्तयित्वा न्यसेत् पुण्यं मूर्द्धि तस्य च भैरव ॥
ततो देवीं समुद्दिश्य काममुद्दिश्य चात्मनः ।
अभिषिच्य बलिं पश्चात् करवालं प्रपूजयेत् ॥
रमना त्वं चण्डिकायाः सुरलोकप्रसाधकः ।
ॐ ऐं ह्रीं श्रीं खड्गेति मन्त्रेण खड्गं प्रपूजयेत् ।
लवणं पिनाकपाणिश्च कालरात्रिखरूपिणं ।
उयं रक्ताख्यनयनं रक्तमाख्यानुलेपनं ॥
रक्ताम्बरधरश्चैव पाशहस्तं कुटुम्बिनं ।
पिबमानश्च रुधिरं भुञ्जानं क्रव्यसंहतिं ॥
अभिर्निशमनः खड्गस्तीक्ष्णधरो दुरासदः ।
श्रीगर्भो विजययैव धर्मपाल नमोऽस्तु ते ॥
पूजयित्वा ततः खड्गं त्र्यां ॐ फट्ति मन्त्रकैः ।
गृहीत्वा विमलं खड्गं हृदयेद् बलिमुत्तमं ॥
ततो बलीनां रुधिरं तोयैः सैन्धवतत्फलैः ।
मधुभिर्गन्धपुष्पैश्च अधिवास्य प्रयत्नतः ॥
ॐ ऐं ह्रीं श्रीं कौशिकीति रुधिराण्यायितासि मे ।
स्थाने नियोजयेद्रक्तं शिरश्च सप्रदीपकं ॥
एवं दत्त्वा बलिं पूर्णं फलं प्राप्नोति साधकः ॥

that in the eastern districts of Bengal this sacrifice is frequently performed, but the image, instead of being slaughtered by a single individual, is cut up simultaneously by all the grown-up members of the family, either with separate knives, or with a single knife jointly held by all. This is known by the name of *Satrubali* or "sacrifice of an enemy." The sacrifice, both in the case of Nara- and the Satru-bali, is performed secretly, generally at midnight. The *Satrubali*, however, is a distinct rite, apart from the Narabali of the Káliká Purána, and authority for it occurs in the Vrihanníla Tantra, in which it is said, after performing certain other rites therein described, "a king should sacrifice his enemy (in an effigy) made with dried milk (*khíra*). He should slaughter it himself, looking at it with a fiery glance, striking deep, and dividing it into two with a single stroke. This should be done after infusing life into it by the rite of *Prána-pritishthá*, and repeating the name of the person to be destroyed. O consort of Mahéśa, he doubtless destroys thereby his enemies."*

The offering of one's own blood to the goddess, to which reference has been made above in the extract from the Káliká Purána, is a mediæval and modern rite. It is made by women, and there is scarcely a respectable house in all Bengal, the mistress of which has not, at one time or other, shed her blood, under the notion of satisfying the goddess by the operation. Whenever her husband or a son is dangerously ill, a vow is made that on the recovery of the patient, the goddess would be regaled with human blood, and on the first Durgá Pújá following, or at the temple at Kálighát, or at some other sacred fane, the lady performs certain ceremonies, and then bares her breast in the presence of the goddess, and with a nail-cutter (*narūṇa*) draws a few drops of blood from between her busts, and offers them to the divinity. The last time I saw the ceremony was six years ago, when my late revered parent, tottering with age, made the offering for my recovery from a dangerous and long-protracted attack of pleurisy. Whatever may be thought of it by persons brought up under a creed different from that of the Indo-Aryans, I cannot recall to memory the fact without feeling the deepest emotion for the boundless affection which prompted it.

Of human sacrifices among the non-Aryan tribes of India, it is not my intention to make any mention here, so I bring this paper to a

* ततः शत्रुबलिं राजा दद्यात् क्षीरेण निर्मितं ।
 स्वयं विन्द्यात् क्रोधदृष्ट्या प्रहारजनकेन च ॥
 कोपेन बध्नन् देवि सत्यं सत्यं महेश्वरि ।
 प्राणप्रतिष्ठां कृत्वा वै शत्रुनाम्ना महेश्वरि ।
 शत्रुक्षयो महेश्वरानि भवत्येव न संशयः ॥

close by adding the following summary of the conclusions which may be fairly drawn from the facts cited above:

1st. That, looking to the history of human civilization and the rituals of the Hindus, there is nothing to justify the belief that in ancient times the Hindus were incapable of sacrificing human beings to their gods.

2nd. That the S'unahsépha hymns of the Rik Sañhitá most probably refer to a human sacrifice.

3rd. That the Aitareya Bráhmaṇa refers to an actual and not a typical human sacrifice.

4th. That the Purushamedha originally required the actual sacrifice of men.

5th. That the Satapatha Bráhmaṇa sanctions human sacrifice in some cases, but makes the Purushamedha emblematic.

6th. That the Taittiríya Bráhmaṇa enjoins the sacrifice of a man at the Horse sacrifice.

7th. That the Puráṇas recognise human sacrifices to Chaṇḍiká, but prohibit the Purushamedha rite.

8th. That the Tantras enjoin human sacrifices to Chaṇḍiká, and require that when human victims are not available, an effigy of a human being should be sacrificed to her.



JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL.

—◆—

Part I.—HISTORY, LITERATURE, &c.

~~~~~

No. II.—1876.

~~~~~

Description of a trip to the Gilgit Valley, a dependancy of the Mahārājā of Kashmir.—By CAPT. H. C. MARSH, 18th Bengal Cavalry.

(With three plates and a map.)

Starting in the summer of 1875 from Srinagar, the chief town of Kashmir, my route lay through the pretty valley of the Pohar river and over the watershed dividing the drainage of the Jhelum and the Kishn-ganga. I crossed over the latter river by a slack twig-rope bridge and continued up the Kheyl nála, a small tributary coming from the highlands under the immense mass of the Nanga Parbat mountain on the borders of Chilas.* I arrived at the Mir Malik district of the Astor country by an hitherto almost unknown pass, called by the Astories 'Sheothur' or Bone-cutting, about 15,000 feet high, at that time covered with snow; and marching through the Astor valley (a brief description of which I gave in the 'Pioneer' of January 1876), I found myself at the desolate village of Bunji on the arid banks of the Indus river on the 16th July.

The wars between the former rulers of Gilgit, especially those of Goraman against the Dogras, as the Kashmir troops are generally called, have devastated a once flourishing district, for such it was, in the times of Ahmad Sháb, the former ruler of Skardu.

The present aspect of the Bunji plain is a desert. There are a few fields and trees round the fort itself, the whole country slopes from the high snow-

* A sketch of the Mazena Pass leading into Chilas is given. It was hitherto almost unknown, and is situated at the head of the Roupel Nála, one of the glaciers of the Nang Parbat. The Pass is only open in September and October, and is little used.

clad peaks at the end of the Astor Valley towards the Indus, and is covered with stones and boulders, gravel and sand, cut up by many dry watercourses, presenting the most forbidding aspect of a country brought to ruin by contending factions, not only Dogra and Gilgit, but Astor and Chilas, also Chilas and Dogra, all at various times, within the last twenty-five years, choosing this unfortunate place as a battle-ground. The traveller leaving Kashmir and journeying through these narrow, poor valleys cannot understand why such unproductive conquests should have been undertaken by the Kashmir Government. Even for the greed of dominion, little or no advantage has accrued to the conquerors. In short, the Dogras, in their ideas of conquest, committed a great blunder in annexing either Astor or Gilgit, as both have been a burden on the State ever since their acquisition, Astor having to be supplied with grain for the troops required to hold it, and Gilgit only just supporting the small garrison located there. Even if the taking of Astor is advanced on the plea of strategy, so as to gain a good natural and political frontier on the Indus, what can be urged for crossing that frontier into a far off and useless country like Gilgit, of small resources and difficult to hold.

The former inhabitants of Bunji were Shins mixed up with Bhútiahs from Skardu, but latterly, before its final destruction about 1852, most of the people were Shins from the opposite and populous valley of Sye. The Fort was rebuilt by the Dogras in that year, but the fertilizing canal which used to bring water from the adjacent nála was not repaired, so that the present village consists of less than a dozen houses of Kashmirí thieves, transported to the place, and a company of sepoy in the fort.

The few fields are eaten up by grasshoppers that annually appear about harvest time, and the villagers have a constant struggle for life. The soldiers are fed on Kashmir grain.* The summer heat here is great, the thermometer Fah. marking from 69 to 95 in the shade and over 104 in the sun.

The ferry over the Indus is about two miles from the Fort. The latter is situated at least 500 feet above the river. There are only three boats, such as are used in Kashmir for ferry purposes, each capable of holding some 30 people. The river runs about three miles an hour and is from 500 to 600 feet broad. The road lay through old uncultivated fields, and descending by a winding path down two terraces to the banks of the river, we waited till the Kashmirí boatmen arrived to convey us over. On the bare bank a garden has recently been planted. The natives are very superstitious, and only after many invocations to God for protection on the unstable element, did they allow myself, pony and coolies to embark, a sepoy accompanying me. The two boatmen were not powerful enough by themselves, so we

* For a description of this grain supply see the "Pioneer" of 17th December, 1875, for my account of Ponies in 'Kashmir'.



all had to take to the paddles and urge the unwieldy craft to the opposite or right bank, which is higher than the left, and crowned by an old fort. The scenery of the river is desolate but grand; the surrounding hills, some 20,000 feet high, are bare of vegetation, steep, and in winter peaked with snow, which, however, seldom falls in the valley itself.

Shortly after leaving the river and entering into the Syc valley, which is watered by a stream falling into the river just below the ferry, we came to the first village of a few houses called Dumrote, surrounded by green fields and fruit trees, a pleasant contrast to the desolation on the Bunji side.

After marching up the Syc river three or four miles, we arrived at the junction of two streams, and crossing the Syc, by wading one half and the other half by a bridge, we made a short halt at the village of Sungrot, a large, well populated place, to change our coolies, the Astor ones having come four marches with us, as none were procurable *en route*.^{*} The Vizier, Bagdur Sháh, a Shin, lives here, and is the chief man in the valley; he came to pay his respects, and helped me to get men to carry my traps. The Syc valley from this point contracts, and the path leads along the right bank of the Syc river close to the water. At times the river floods the road. This wild and desolate scene continues for four miles, with high steep hills on each side, when again the valley opens out to nearly its former size, about a mile broad, at the village of Chakerkot.

Here all was smiling plenty and peaceful repose, green fields of wheat, barley and other grains, such as Trombu and China, together with fig, walnut, grape, and mulberry trees, on all sides. The clouds which had been threatening, here broke over us with a crash of thunder, the rain deluging us in a moment, and glad were we to find shelter in the small enclosed masjid of the village. The mosques of these countries are enclosed and have deep verandas round them, if in populous places; if not, they are simply a square room with a small door and a hole in the roof to let out the smoke of the fire, which generally burns all day long.

I was soon surrounded by the simple villagers, but unfortunately not understanding their language, Shina, could keep up but a broken conversation in Persian with the Mullá, who only knew a few words.

After the storm was over, we came out and found the court in front full of people, mostly children, who had come to see the Firingí, or Farang. Again changing coolies, we continued our march through the pleasant fields and under the shade of fruit trees. The path ascends the valley, passing

* The method of forced labour in these countries is unavoidable with the present arrangements, causing great discontent and even desertion into other countries. All might be obviated by a good road to facilitate pony traffic.

many small hamlets and solitary farms with pretty scenery, till the village of Jugrote is reached five miles from Sungrote. Here my tent was pitched, close to the well-kept mosque.

The lower and inhabited part of the Sye valley, only twelve miles in length, owing to its fertility, is the envy of the surrounding countries. The inhabitants are all Sunni Muhammadans of the Shin clan, and this small community never having been able to hold its own against its more powerful neighbours, Gilgit and Chilas, has passed from hand to hand according to the varying fortunes of either tribe, but still has escaped the fate of Bunji, owing, no doubt in part, to the people being more industrious and helping one another, and in part to the great fertility of the soil and plentiful supply of water. The people are an independent set and must be gently used, as they brook little tyranny at the hands of the Kashmiri; for if taxed too heavily, they pack up their goods and chattles and making a flying march with their families and cattle, go over into the Yaghy or Free country of Gor and Dareyl, which are situated at the back or west of their valley.

There is another road to Gilgit higher up the Indus and along the Gilgit river, from its junction upwards, not used for some years past, a part of the road having been carried away into the latter river by an earthquake.

Continuing my route, the road to Gilgit leads straight up the Sye valley to Jugrote, and the Pass of Niladar between the two countries overhangs the village. The south side of the Niladar pass is easy, but has no water on it; the lower ascent is gradual, over a stony hill side, but the upper part is steep and rocky, all of a red colour. A well defined path leads all the way up the Pass, which I traversed on foot. The summit, reached in about two hours, disappoints one as to the view. The Sye valley and Indus below look pretty, Bunji a dark speck of green on a red field. A short distance still further up, the Barbuni* valley can be seen, but of Gilgit, little more than a confusion of rocky bare peaks, the river being hidden in its deep bed.

The descent is very long, but at first gradual, and if we divide it into four parts, would be described as the 1st and 2nd parts an easy slope over a bare waterless gravelly plateau. A large herd of urial, or wild sheep, enlivened the scene; they kept too far off to give me a shot, galloping away out of sight over fearful ground. In the 3rd part, the descent becomes more rough and steep, the river below, with a part of its valley, comes into view, as the path leads more to the north-east and parallel to the Gilgit river, the lower part is the most trying, still steeper and rougher, till at last we scrambled down into the river bed by a nearly precipitous cliff, and rushed to drink of its muddy waters, now swollen by melting snows. The path then leads up the steep bank again, crossing many wearisome

* The local name of the Sye River, which rises on the south slopes of Pehot Mountain, on the boundaries of Dareyl and Gilgit.

ravines, till, fairly tired out, the traveller (riding not being easy on such a rough road) at length arrives at the high slope on which Minnor, the first large village in the valley, is situated.

I reached this place at 2 P. M., having been on the move from dawn, the distance is about 12 miles.

The Justero, or Headman, brought me a 'dollie' of fruit, which was most acceptable to a weary man. The village contains about 30 houses and is prosperous; the inhabitants are Shins as in Astor, and mostly understand the Hindústání spoken in the Panjáb, owing to their intercourse with the Dogra troops, which have occupied the country continuously since 1860. I remained at Minnor two days. It was most enjoyable under the shade of the walnut trees in the village green, but in the middle of the day in the sun, the heat was great. The peculiarity of this village was, that it kept no poultry, because, as the old Justero told me, in former days, they had had a great faction fight among themselves, owing to the fowls of one of the villagers having got into the garden of another, and eaten some of the fruit in it: after the fight was over and their hot blood had cooled down, the old men made all swear that they would never keep any more fowls in the village. But though I could not obtain fowls, I had plenty of food brought me as presents in return for my medicines.

I always travel with a supply of common drugs, and invite patients to come to me for treatment, which obtains for me free intercourse with all classes of the people, men, women, and children. There are no medical men in those parts, and the poverty of the masses prevents them from obtaining medicines for themselves, besides their ignorance is great on all such matters. They require very strong drugs to affect them, croton oil being a favourite. The quacks of the country generally use poisons, such as arsenic, in small doses, as purgatives.

Next day we started early, so as to arrive in Gilgit before the great heat. We soon got clear of the range of the village fields and the shade of trees, back into the heat and glare; ther. 103° at noon in shade. A fine view of the Gilgit valley was before us, the river below, the bare rocky hills on each side with the snowy peaks of Hara-mush, 24,000 ft.; Dubani, 20,000 ft.; and Rakiposhi, 25,000 ft. high, in the distance to the north-east.

The valley is three miles broad at its greatest width, but opposite Minnor only a mile. The villages are situated where sufficient water can be obtained for irrigation purposes. The supplying streams have thrown up a sloping plateau with the débris brought down from the hills. On these high slopes the villages are built, surrounded by trees, and easily seen at a distance, owing to the whole country being a light red colour without vegetation.

The path is good and fit for ponies. We passed through the small village of Sakewan, watered by a stream which, like that of Minnor, nearly dries up in

August; then on again over desert till the Sonéup stream is reached, which flows from the peak behind the hills to the west, called Kumeregah, a day's march off. Half the water is wasted, as is usual in these countries, owing to carelessness and indifference: no tanks or dams are made to retain water for the dry season; water-wheels are also unknown. We forded the stream, sweet to drink, but icy cold, and rested in the village of Jutial just beyond, from whence is seen, far below, the plain of Gilgit, with its Fort by the river side. Here we had a great feast of grapes, rich clusters hanging within reach of the road side. Throughout the country grapes are not picked by the people before they are fully ripe. A day is fixed for the vintage, when they are cut by the men and carried home by the women with great rejoicing; most honestly is this custom carried out, they do not object to a stranger eating, but will not touch them themselves, they also impose a fine of a kid on any one found trespassing. The old Justero of Minnor's little son was brought to me for treatment, and on asking him if he had eaten anything that morning, after a great deal of pressing and persuasion, he acknowledged he had eaten some grapes!!! A roar of laughter was raised at this answer by the bystanders, as the old man would have to pay a kid for the boy's fault.

I had a deal of trouble and delay, caused by the frequent changing of coolies, as they will only go from village to village. No amount of pay could induce them to go beyond the next village; for they hate carrying loads, and do not care for the few pice they can thus gain.

The plain immediately surrounding the Fort, the centre around which the many villages are dotted, is about four miles long and two miles broad, bordered by the river to the north, Jutial to the south and east, and the heights of Nafur to the west. It is about 200 feet above the river, and is plentifully watered by a canal, taken out four miles up the river; on its right bank it is well cultivated and peopled.

On passing the first few houses of the village, the coolies asked me where I should like to camp, so I chose a nice dry spot under a walnut tree about 400 yards from the garden, in which lie the remains of poor Hayward, who was murdered in Yassin in 1870. I did not go near the Fort, because of its disagreeable proximity to the Dogra sepoy, a dirty lot. The great object in choosing a camping ground, is to escape from the musquitoes which infest all damp places in the valley.

Close to me were encamped two other travellers, who were having a national dance performed by some Gilgitis. It was an animated scene, we sat in the inner circle, and were surrounded by a large crowd of Dogras and villagers, all attracted by the sound of the fifes and drums, to which the dancers kept time. Some of the dances were 'Pas-de-seul', others again were danced in a circle by a number of young men, the pace and gestures of each

increasing as they warmed to their work, all keeping pretty good time with the leader of the dance. Amongst those assembled on this occasion were the Kárdár, or Governor, of Gilgit, an old Sikh, Bhai Ganga Singh, the General commanding the Kulla fauj, or Militia, Mán Singh, and Colonels Tej Singh or Teju, and Hushiára, commanding the two Regiments quartered here, also the Vizier of Gilgit, Ghulám Haidar, and some of the people from Yassin, who were accompanying the Envoy sent to the Governor of Gilgit. The same evening we heard of the death of the wretch Mír Walí, the murderer of Hayward, he having been shot ten days previous to our arrival. The following statement was the account we heard :

Hayward was killed by order of Amán-i-Mulk, ruler of Chitral, by Mír Walí, the Rájá of Yassin, his son-in-law, who was assisted by Rahmat, his prime minister or Vizier, and Muhammad Rafi' Nabí Beg, foster-brother to the Mír. Nabí Beg's mother having, from the death of his own mother, brought up Mír Walí from the cradle. The unhappy traveller was murdered just outside the village of Darkot, a march beyond Yassin towards the Pamir Steepe. When Mír Walí obtained Hayward's loot or property, he fled to Badakhshán with it, and asked the assistance of the Duránís of Kábul, to recover his country from Phailwan, his younger brother, who had been given the throne of Yassin on his flight to Badakhshán. Mír Walí stated he fled, because he fancied Amán-i-Mulk wished to get him into trouble with the Kashmír authorities.

About two months ago (May 1875), Mír Walí, still with the Duránís, finding that Amán-i-Mulk retained a bad feeling against him (for not giving him a part of the spoil) and would not return him his country of Yassin, sent his wife, Amán-i-Mulk's daughter, and her little son five years old, to him, to Chitral, saying, "If you will not make friends with me, at least do something for your own daughter and her son, let him have Yassin; if not, I will get Durání help and bring a force against you."

Amán-i-Mulk, Rájá of Tatíal, as that part of Chitral round the Fort is called, being uneasy at these threats, determined to throw himself into the hands of the Duránís, with whom he had been lately far from friendly, because they had been trying to take some small forts from him,* so he sent Phailwan to Takhtpul near Balkh, to the Durání Governor of Turkistán, with a message, saying "I will salám to you, give you my daughter in marriage and all my wealth, if you will turn Mír Walí out of Badakhshán." The Duránís had on Mír Walí's first flying to them demanded of Amán-i-Mulk his restitution to Yassin, but now on Amán-i-Mulk's overtures, turned against Mír Walí and ordered him out of their territories. Mír Walí had, since

* These forts are situated on the south slopes of the Hindu-Kush, on the confines of the Bashgali or Káfir country, which shows that Kábul is trying to extend her rule beyond Badakhshán into Chitral by the Dorah Pass from Zebak.

his murder of Hayward, been staying at a small place called Gurgial, close to Kil'ah Punj, a few days journey to the north of Chitral across a range of the Hindu-Kush, called Yarkun.

Phailwan, as soon as his embassy proved successful, returned to Yassin, and about fifteen days ago (4th July, 1875), Mir Wali, having been turned out of Gurgial, was coming over the Yarkun into Mustach, when he was way-laid in a narrow spot, quite close to that place, by two sons of Hayát Núr; Phailwan's Vizier, with 50 or 60 men. Mir Wali had 40 Chitral and Yassin men in his pay, who had shared his fortunes, also his foster-brother Nabí Beg, who had assisted to murder Hayward, and was his factotum; as soon as the Mir saw the ambuscade into which he had fallen, he drew Hayward's revolver and shot at one of his enemies, the ball striking his head and glancing off the turban. Mir Wali was then killed by two bullets, together with three of his men, the rest were captured—of the Yassin party Hayát Núr's youngest son was killed together with several men. Nabí Beg is amongst the prisoners.

This is the account accepted generally by the people themselves of this affair. The next day, my two friends left for Astor.

I found great difficulty in getting my shoes and chuplis, or sandals, mended; they do not cure leather by tanning, in all the countries of Yagistan, but simply rub it together till it becomes like wash leather. Of course all leather articles waste away like paper in wet weather, and the people depend on harness or sword belts from Kashmír or Badakhshán, from whence they also obtain their matchlocks.

The people are very ignorant, and less warlike than their neighbours, which accounts for their having been conquered. When the Dogras first came into Gilgit in 1847, they found all the now cultivated land, a jungle of wild fruit trees, with a few huts, in which the inhabitants lived in wet or cold weather. This jungle they first cleared, and only in the last eight years have the people been taught to cultivate the land as they ought.

I went to see the Fort, built of earth many years ago by Gurtam Khán, a former ruler of Gilgit. It has changed hands many times, and has often been demolished and rebuilt. Goraman rebuilt it of stone and mud, lime being unknown to these people. Within the last fifteen years, the Dogras have entirely rebuilt it on a new site close to the old Fort, which lies a heap of stones. It is now built of beams of wood, stones and clay in layers, the wooden frames helping to bind all firmly together. There are double walls; the inner court is used as a store-room for provisioning the garrison. Its armament consists of 1 small six-pounder brass gun, 6 "sher-bachas", or 1 lb wall-piece swivels, and six large "jazáils", or two ounce matchlocks.

The garrison is made up of about 500 men, mostly militia. They drill daily after a fashion, and, for the country, are a sufficiently powerful force

in ordinary times, to hold the place. The fort is on the banks of the river, 100 feet above it, and depends on the river for water, a covered way leading down to it. The other day an earthquake shook down one of its bastions, which was being repaired during my stay. The highest bastion commands the river on both banks and the whole plain. A few of our shells would soon demolish the whole affair.

The difference of level of this river in the hot and the cold weather is fully 20 feet. It contains few if any fish, and the sand is not washed for gold as is the stream coming from Hunza and Nagyr, which contains quantities of the precious metal. The snows melting in July and August on the Pamir and highlands of Yassin, raise it to its highest level; in winter it can be waded across at most parts, up to the junction of the Nagyr stream, at the village of Dyor, a short way below the fort, from which point till it joins the Indus it is too deep. No boats are used on the river, nor are rafts brought down its floods. Only one bridge of twig ropes crosses at Gilgit, the opposite or left bank not being as well inhabited as its right.

There are many who speak Persian among the Gilgitis; some Yassinis are met with, as a Vakíl and ten men are detained here and changed from time to time. These are guarantees for good behaviour, which shows that Kashmír exercises a certain amount of influence out of its own immediate boundaries, as the Rájás of Hunza and Nagyr also send Vakíls, but no Kashmíri is allowed to live in either Yassin or Kunjut, as Hunza and Nagyr are called, although they are separate and independent states.

I have daily large presents of fruit brought to me by my poor patients, grapes of three sorts, white, yellow, and red; apples of two sorts; water-melons large and sweet, long in shape, also cucumbers and figs, the fruits now in season. In the evenings, I have large audiences, visitors coming from far and near, to talk. I do not think the people are such bigoted Muham-madans, as in our North-West frontier, and a Medical Missionary who understood the dialects spoken, would have a fair chance of being listened to patiently. These people are very ignorant, though a few learn the Korán by heart, both men and women.

Manufactures are very rude, a coarse cotton cloth, about fifteen inches broad, and quite plain, also a stuff of wool. Wooden platters, bowls, and spoons, very bad soft knife blades, no guns or swords, or leather articles. Boots, or Pabus, made like moccasins, are of raw hide, and are used only in dry weather, and a description of long stockings made by women of coloured wool like a bag without a heel; some of the patterns are pretty and effective. All well-to-do persons wear these, but like most articles they are made for home use only, few being obtainable in the market. The head dress of the people is not a turban, but a broad topped cap made like a bag, its edge being rolled up, so as to form a thick brim, which can be pulled down over the ears and neck in cold weather.

The name Boté, as the people call themselves, is not to be confounded with the Bhútias or Tibetans. The name is derived from the cap, so that all who wear this headdress, be they Shí'ah, Sunní, Astorí, Gilgiti, or Chílási, Shín, or Yeshkun, are Boté, although the difference of language is great between all these countries, especially the latter. Of the two castes, if one might so call them, the Shín is the highest, and forms a comparatively small, but influential body throughout Astor, Gilgit, Guaris, and parts of Chilas; they are careful to intermarry only among themselves, but of late years, the Yeshkun, or mixed breed, is unavoidably increasing, owing to the pressure put on by the Kashmírís, who all like to intermarry with Shín families if possible. The Shíns are a fine class, and look upon themselves as the *crème de la crème*. In Gilgit there are about 100 families of pure descent, they are looked up to as upright honest people, whose word and faith may be depended upon, in fact most of the heads of the villages are Shíns.

The Kárdár, Ganga Singh, had on the departure of my friends for Astor, gone to Sher Kíl'a, to place on the *gaddí*, or throne, the son of the late 'Tsá Bahádur, chief of that place, who had died a month before our arrival, and now came to see me in state with a large following.

He is a little old man, very polite, was formerly the Darbár Munshí to the Resident at Srínagar. He has lately been made Governor, and is well acquainted with our ways. I told him of my desire to proceed to Gaokuch, the furthest point on the Kashmír frontier. He of course made every excuse, as roads were bad, nothing to be seen, great heat, no food, &c., &c., but seeing I was determined on going, he gave in with a good grace, and made all the arrangements necessary for my comfort and safety.

I visited Colonel Teja Singh, some relative to the Maharájá of Kashmír, a broken-down old man, and the Sunadis, or General, Mán Singh, who were both hard at work, the former, in drilling the troops, the latter, making improvements in and about the fort. The troops were expecting their usual two-year relief, and longing for the return to Kashmír and Jammú. They have rather hard times of it in this outpost, getting few or no luxuries, as all articles imported are very expensive, and money scarce.

The coinage is copper, and has to be brought from Srínagar, which increases its value much. The usual rate for pice at the capital is ten to the anna, but here only four go to the anna, which makes all small articles in the bazar very expensive, for instance, tobacco, sugar, and salt, all of which have to be imported.*

In my evening strolls amongst the villages, I came across some ancient mounds and slabs of sandstone and granite, the remains of the palace of a former Rájá by name Shirbudut, regarding whom are many popular

* It would be a gain to travellers to take coppers with them.

legends, one is—Azro Shamsheer, a demigod who appeared on mount Koh, opposite Minnor, heard how much the people were oppressed by Shirbudut, and came to the palace to try and rid them of the tyrant. The palace had no gates, but the Rájá had a flying horse which used to leap the walls, and alight always on one spot. Shirbudut had a daughter, whom he used to bring out on his horse for a walk at times. Azro while devising some scheme, was one day walking round the Castle walls, when the Rájá and his daughter 'Urzu' suddenly appeared on the horse and alit at their usual place. He hid himself and saw the Rájá go into the mountains to shoot, Urzu being left behind to amuse herself under some shady trees. He went up and made himself known to her, and to make a long story short, they fell in love, and after many difficulties Azro killed the Rájá, married the beautiful Urzu, and became Rájá of Gilgit. They had a daughter by name Jaushini, who married one of the ancestors of Ahmad Khán, chief of Skardu, by name Mirzá. Jaushini ruled in Gilgit in her own right, and was as much beloved by the people as Shirbudut had been hated. One day, the Queen and her consort were sitting under the shade of their fruit trees watching their maids treading the wine-vat, when a crow alighted near them and began cawing. She being annoyed asked him to shoot it, but Mirzá from some superstition refused to do so, and the Queen, taking up his gun to fire, shot it dead with a bullet. He was greatly surprised at her good shot, and taking into consideration other wonderful feats he had noticed in reference to his wife, concluded she must be like her father Azro, more than mortal. He separated himself from her, fearing her violent temper and returned to Skardu. The Queen remained in Gilgit, and after reigning eighty years, one day disappeared. The son of her daughter who had married Habí Khán, a Nagyr chief, succeeded her, and from that son was descended Gurtham Khán, Rájá of Gilgit, who is still remembered by "the oldest inhabitant." The old Polo ground near the Masjid now lately taken into use again by the Gilgitis, is said to have been laid out and used by Shirbudut.

The village of Nafúr, situated in the slope of the hills which bound the valley to the west, and considerably above the Fort, has a curious Buddhist figure carved on a rock at the side of a nála, which is said to be very ancient. From this village a good view is obtained of the Gilgit Valley, the temperature also is lower, and having some fine old Chinárs, is a pleasant place to pass the day.

I used to be surrounded by patients, whose number increased daily. They came from all parts, Yassin, Hunza, Nagyr, Dareyl, Tangyr, and Panyal, all surrounding states, even the sepoys and officers from the Fort and traders from Koli and Palas on the Indus came to me for medicine. Every disease flesh is heir to, here finds its representative.

Amongst others the vakíl from Yassin, an old Sayyid, blind of one eye, came to have the other doctored, and after I had applied a remedy, he stood up, and with upraised hands gave me a blessing from the Korán in Arabic, to which, when he had finished, the whole assembly said Amen,—an impressive scene.

The old Colonel from the Fort came for some magical elixir, to reinvigorate a system broken down with debauchery—also two merchants from Koli, who were here collecting their debts (which are paid only in gold dust). These were fine large men, but nearly disabled by rheumatism. Goat-herds from Dareyl also came to ask for drugs.

Having now been encamped for a week and the heat daily increasing, I determined to push on as fast as possible, so striking my tent at dawn of the 26th July with only seven coolies and a pony I started. The first part of the way led along a raised road with a canal on the left, and after passing out of the villages, we reached the river, and went along its right bank to the village of Bassein, where they grow rice, down to a nála which is bridged; then the road leads up over a steep spur to the house of 'Azmat Sháh and his family, the rightful heir to Yassin, now a pensioner of the Dogras. He was absent in Srínagar urging his claims, so I did not see him, only his son. There is a nice Polo ground through which the path leads, and a mile beyond, the upper Gilgit Valley begins to close in. The dry steep cliffs radiate great heat, and all is desolation, as far as the hamlet of Hunzil four miles. This spot has been uncultivated for many years past, and we saw the first crop of wheat stacked. There are no trees here, only a few fields and two huts. A high conical mound marks the ruins of a former monument of some sort of which nothing is known.

A short 300 yards beyond is a rock with water near, which affords shade up to noon, the path then ascends a very bad spur called "Katate" and along the steep banks of the river. Just at the worst spot where the path way is so narrow, that two ponies can hardly pass, I met young Fúlád, 'Isá Bahádur's little son going to Gilgit to be educated. My pony nearly kicked him down into the river, the plucky behaviour of the two men leading the animals (it being too steep to ride) only prevented an unpleasant accident. Then descending to the river bank along a short level, we arrived at the foot of a granite spur up which the path leads, with no shade, only glare and heat.

From the top of the spur, Hunzil is to be seen below, bearing 340° , then scrambling down again to the river, which is here very rapid and narrow, we had a long sandy stretch along the water. This part is called 'Yaspur Kun.' The river widens again soon, and reaching some tamarisk trees we rested in the shade at 2 P. M., thermometer in shade 105° Fah. The river here has a few islands in its bed covered with long grass and bushes. The path usually runs

along its right bank when the water is low, but owing to its sudden and great rise we had to make a long *detour* over a high hill up which three paths lead, the upper for ponies and the lower for footmen, but being in the jungle with no one to ask the road we had great trouble. The pony had to be led along the upper road, too steep to ride. I wished to go the shortest cut, but the coolies being behind I had no one to show me the way, so I wandered out of the right direction and had great difficulty in finding the road. At 5 P. M., I reached the top, five miles from Hunzil, and saw Panyal below me due west, the descent was very bad. By sunset I reached the first village, three miles from top of the mountain, called Sherote, the last mile only being a good road.

How refreshing it was to enter this oasis! Its rippling streams, shady groves and clustering fruit made us forget the fatigues of the day. The tent was pitched under the Chinárs, where the villagers used to assemble in the cool of the evening.

One of the streams fed a covered tank, used to keep the drinking water cool, and here came the maidens not only to fill their pitchers, but to have a sly peep at the strangers. The village consists of twenty houses, enclosed by a stone wall, which has acted as a fort in past rebellious times. This is called the boundary of Gilgit and the beginning of the country of Panyal. In reality Gilgit ends at Hunzil, but they say a former Rájá gave this and its sister village on the other side of the river, as a dowry with his daughter to a Rájá of Gilgit. The boundary is only political as these Sherotis have the same manners and customs as all the others villagers of Panyal.

Panyal is the long upper valley of the same river I had been following. The people are all Shi'ahs, instead of Sunnis as in Gilgit. Their language is almost the same, but with less Panjábí, and more Yassini and Persian. Throughout this valley the people keep silkworms, and reel silk. They also make wine; of course this to an orthodox Sunni is a great sin, so they are called Ráfizí, Moghlí, and other terms equivalent to Káfir. The inhabitants are much more free and easy than in Gilgit; the women do not hide themselves or their faces, they are all dark brown, but not black. Some few of Yassin and Chitral mixture are fairer than the rest, but the great heat of the summer keeps the colour quite brown. My cook quite beat by the march, did not give me my dinner till late, and as I lit my lamp, the young fry collected round me, and I shared my roast fowl with two boys who seemed very much to enjoy a change of food, and were the envy of all the others.

Two sepoys live here to collect toll, and tithes of all the produce in kind, money being a very scarce commodity. These men are to be found thus in pairs in all the villages of this country, they feed on the fat of the land, pay for nothing, and consequently are well hated. They assisted me to get

my coolies, so that I was able to start early, after giving out a few doses of medicine, the fact of being able to obtain medicine gratis has gone before me, it is the first thing I am asked for, and I have obtained the name of the Hakím Sáhib. I wish I were better able to support the title, it was little I could do, my stock being very small. The narrow path between the high walls and hedges of the gardens took some time in traversing, but when clear of the village, I saw that the valley here is only about three-quarters of a mile wide, very barren looking, shut in with high bare hills. The path leads down to the nála which runs from the Hills to the south, past the small Fort of Shipyot. This has six bastions, and was built by the Dogras about twelve years ago on the occasion of the attack of Malik Amán and his brother Mír Walí from Yassin, 'Isá Bahádur defeated them by help from Gilgit.

The river runs close under the Fort. We now enter into the territories of Panyal proper under 'Isá Bahádur, the chief of Sher Kíl'a, or rather under his son, as 'Isá died lately. After crossing a long sandy flat, at least twenty feet above the ordinary level of the river, which has been known in high floods to cover it and do great damage to the surrounding countries, we ascended gently up to the village and Fort of Golapur, about five miles from Sherote. The village nestles under its cool green trees, and is famous for its grapes. About twenty houses are scattered over the slope.

I pitched in a garden of apple trees laden with fruit. The next garden, enclosed by a wall, belongs to Rájá Langar Khán, he was absent in Kashmír, having gone as a hostage for two years, leaving his family here. His little son, five years old, came to make his saláms and brought a basket of fruit. A faqir and his son, both very intelligent, came to have a chat. They only speak Persian and Yassini, and being Badakhshís, they were quite fair, with delicate features, they made their livelihood by doctoring and selling charms, and were quite glad to see a real Hakím as they thought. Their general remedies are opium, arsenic, sulphur, and mercury, which are used equally for all diseases. I gave them some quinine, which they had not seen before, also a very potent medicine in the shape of Worcester Sauce !!, a tea spoonful of which nearly choking them, gave them a great idea of the efficacy of my drugs.

Leaving Golapur next day, we came shortly in sight of Sher Kíl'a, a large fort and village surrounded by gardens and fields, on the opposite side or left bank of the river, situated on a long slope from the high hills which back it.

Our road led over tolerably level ground, and along a cliff above the river about 50 feet high, path very narrow, rocks of conglomerate and sandstone. The Fort has 13 towers and is the largest in Gilgit. The communication to this right bank is by a rope bridge of the usual shaky structure. Animals crossing have to be swum across, which is only possible when the river is low.

When we arrived opposite the Fort, I was met by the young and newly

made Rájá Akbar Khán, son of 'Tsá Bahádur, and his following. He is a heavy-featured lad of eighteen, and speaks little but his mother-tongue. After a short chat with his people and the Guard of Honor, supplied him from Gilgit, (in reality to overawe the rather turbulent population) I continued my march. The path then descends to the level of the river along a narrow ledge, the site of many a fight, opposite which is the village of Hammuchul on the left bank. The spur of Gaishéli with its steep climb brought us to the upland slope of Dalnath, with its bright sparkling stream allowed to run to waste, the village having been depopulated in one of the late wars and never been re-inhabited.

This fact of depopulation is the curse of this small but fertile valley. Situated between two powerful neighbours, Gilgit and Yassin, the unfortunate people have suffered from both sides, have been taken off *en masse*, either to populate Yassin or sold into slavery, a few finding refuge in the neighbouring states of Dareyl and Tangyr. After our midday meal under the shade of the willows which border the Dalnath stream, we wended our weary way over a bad rocky spur down again to the river, then up again over a hill side opposite to the nála which brings water from the high hills above, to the village of Japoké on the left bank; then continuing we reached Gitch, a small village, 8 miles from Golapur; then again by a level path over a stony uncultivated flat above the river, from which we began to ascend a narrow ledge of limestone rocks, with a very difficult bad road, hardly passable for ponies, but easily defended.

A second road leads up over the tops of the hills from Shere, so as to avoid this narrow ledge, and is the usual road taken by an hostile force from Yassin. At the highest point of this narrow ledge and high up over the river which rushes past its perpendicular base, is a flat stone under which a lookout is kept towards Yassin, to give warning to Sher Kil'a, in case of trouble, which in Goraman's days was common enough. Opposite this place, on the left bank, is a small village of Dajipoker with its few corn fields. The path improves as the ledge of rocks becomes broader, and finally leads to Singul, a large village with extensive gardens and fields with a small fort for its defence. This was our halting-place, and while the camp was being pitched, I took a stroll into the fort. Conceive a space of 150 feet square, surrounded by 25 to 30 feet walls, without any space left as a court, but quite crowded by small irregular huts, some parts in two to three stories, communicating one with another by dark passages and notched logs of wood to ascend to the roofs; then imagine this crowded with men, women, and children, all their rags, cooking pots, agricultural implements, guns, dogs, and fowls, and a faint idea of the conditions under which they live can be obtained. The force of circumstances obliged them to crowd into forts in former days, but as Dogra rule has been paramount for at least twelve years, habit has still

the mastery, and sooner than live out, each on his own land, they still sleep at night inside their forts, collecting the cattle close under the walls in enclosures outside.

The stream which supplies this village flows down from the range of mountains that divide Dareyl from Gilgit, and along this nála come the wild inhabitants of those hills to seek a description of salt-earth for themselves and their goats, on vast flocks of which they principally subsist, agriculture being at the lowest ebb owing to the insecurity of life and property.

This village of Singul, where I stayed a week on my return from Gaokuch, waiting for an answer to a letter I had sent to the Kárdár for permission to explore the nála to the confines of Dareyl, (but to which he would not consent saying it was too dangerous) presents nothing to attract the traveller except its simplicity. I used to roam about the fields and gardens, which are well cultivated, producing maize, wheat, barley, beans, carrots, turnips, pumpkins, gourds used for carrying water, radishes, cucumbers, and garden stuff, as salads, spinach, capsicum, mint, fennel, pepper, one or two plants which yield dye, &c., &c.

The fruits in season were pomegranates, grapes of three sorts, figs, apples, mulberries, peaches, apricots, and walnuts, from the kernels of which they make oil, melons and a few cherries. All these fruits ripen towards the end of summer, so I used to feast daily on the best while chatting to the villagers at work, a quietly inclined people if let alone. No doubt with proper security for property, and no marauding sepoys allowed, the whole of Panyal would produce silk and grain more than enough to pay its expenses.

Iron is not found in the valley of Gilgit, coming mostly from Ladak and Kashmir, consequently there are few workmen. The utensils they use are mostly of a coarse soft green semi-transparent stone, called Baloshbut, or pot stone; these stand fire and are universally used throughout the surrounding countries. Bullet moulds are also cut out of the same material.

They do not consume much meat, being too poor, but live principally on coarse mixed flour, cakes, ghí and milk. Wine in large quantities is made, every large garden having its wine vats. The manufacture is of the simplest description. A trough four feet long by two broad and three feet deep, is constructed of large flat stones cemented with clay; at one side, near the bottom, is a hole, closed with a wooden plug covered with cloth. The grapes plucked in bunches by the women and children are carried in large baskets, of which the side next the back is flat; the grapes are thrown into the vat as they come from the garden, when heaped up a boy gets in and with naked feet treads it all into a mash; the plug is removed, and the juice flows off into a large hole in the ground immediately under. Here it remains covered up for a month or two, till fermentation is over, or till the owner has no further patience.

The hour fixed for the opening is a joyous one, young and old, men and women, assemble to take a little, and amidst a tumult of joyful acclamations and song, they bear away the precious liquid, and store it in their rooms in the fort. Having no pottery, being unacquainted with its manufacture, most of the liquid is drunk as soon as possible, and a little kept in skin bags and wooden bowls. The women never get drunk, the men often.

I was greatly troubled by sandflies at this place, which are worse in shady damp places, but in a dry spot they only appear at sunrise and sunset.

On marching from Singul, we first crossed the nála, at the mouth of which it is situated, by a rope bridge. Large quantities of fish were observed lying quietly at the bottom, no one troubling them by net or line.* A guard remains here on the lookout for armed Dareyl robbers, who come down the nála on marauding expeditions.

A dam of stones turns off the stream from washing away the fort. The road leads along the flat and high bank on which there is no cultivation, being covered with boulders detached by earthquakes from the granite rocks above; these are of no rare occurrence, I saw a case of a large fall of rocks and earth close to the Fort at Gilgit during a slight shock we had. A couple of miles brought us to the village of Gulmutti, opposite which is the large Fort and village of Bubbur.† The influence of the Rájá of Gaokuch commences here, as they give tithes to him as well as to Sher Kíl'a. Changing coolies at the fort of Gulmutti, where they brought me a large present of grapes and melons, we continued along close to the river opposite the small cultivation of Barjur, a hamlet of Bubbur; the road thence ascends a high spur, called Singdas, which shuts in the river, to a small gorge through which it rushes with great violence.

As I was toiling up on foot, the path very steep and bad, the sun very powerful, I was met by the Rájá of Gaokuch with his 'rikáb', or following. Mutually rushing into each other's embrace, and anxiously enquiring after one another's health and welfare, we continued our course, dipping down to the river again, where under the shade of a few tamarisk bushes, he made me eat a fine melon and smoke the Calmet of Peace. 'Áfiat Khán is a thick set, dark, middle-sized man of common-place appearance, about forty years of age. He was mounted on a good young pony 13·2 hands high, of his own breeding, carrying him well over the bad slippery rocks; finally we ascended the side of the plateau on which Gaokuch stands. The fort and village are situated about two miles further on; no vegetation on this plain till we reached the village. The whole valley is about 1½ miles broad, but as we have been gradually ascending the whole way from Gilgit,

* Otters also abound. The people catch fish by small conical baskets fixed into the end of a dam across the stream.

† A small colony of Sayyids make it of some importance.

the surrounding hills, quite bare, are not so high as lower down. The Singdas spur divides Panyal from Gaokuch. As we approached the Fort, the distant snow-covered hills of Yassin and Pamir came into view. On coming up to the fort, the Dogra sepoy who guard the district, formed up and presented arms to us, a motley group armed with flint-lock smooth bore muskets. My encamping ground, on this 29th July, was a level of green sward, fringed with willow trees, a delightful contrast to the bare rocks and glare of the last few days' journey. Here I was at the end of civilization, and truly glad to have arrived at the object of my desires. The Gaokuch plateau is bounded to the north by high rocky hillocks which descend precipitously to the river. The Fort is built on a large rock, the sketch was taken from the top of one of these overlooking the river, on the top of which I disturbed a flock of urial, or wild sheep.

The whole valley is about two miles broad, of which the plateau takes up $1\frac{1}{2}$ mile, the river and some uncultivated strips on the opposite bank, the rest. This is the 'ultima Thule' of India, or rather of the influence of British Rule. Just beyond Gaokuch, and divided from it by a deep ravine, commence the fields of the extreme frontier village of Aish, and beyond, about four miles, comes the frontier of Yassin. From both sides of the border a strict watch is kept on the opposite party, no one being allowed to pass without a messenger from either Chief accompanying him. I went with the Rájá to the furthest point possible, and there we found two lads of sixteen, keeping a sharp lookout, their matchlocks resting against the rocks close by, and if we had attempted to go further, the Yassins, though we could not see them, would have been sure to have taken a shot at us.

Below us was an expanse of river bed about half a mile broad, without a living creature, or fish or fowl being visible. Opposite was the valley of Karambar winding away into the distance, little known or used, and down it was rushing a broad stream of dirty water direct from the snowy heights of the Pamir. It forms its junction with the stream from Yassin at this point, meeting at about right angles. The two streams create a great commotion, when, as now, the snows are melting, filling the whole bed with a shallow flood.*

On returning to Aish and its fields of golden grain and shady groves, I found under a clump of fine trees a repast laid out in true native style: a basket of hot chapátis baked like "nán", another with a large bowl of fresh curds in which was a wooden spoon. Spreading blankets we all sat down, and had our share of bread with a slice of raw cucumber and salt handed to each of us, the curds were placed in the middle of the party, and

* At the head of the Karambar is a lake formed by a glacier, which dams up the valley; when the lake gets too full and heavy, the dam breaks, causing the fearful rush of water which makes the Indus flood.

as each required so he took a spoonful; in this way we soon finished the first course—after which came some beautiful ripe melons, long in shape with smooth green skins, some with green, others with yellow, flesh; they were cut up in long slices and distributed. The third and final course was a large pannier of apricots, for which fruit the place is famed. I got up after all was over, feeling I should require no more food for a week; then I distributed some tobacco, and took, myself, forty whiffs. The whole proceeding was most picturesque, the place, the men, &c., &c. I shall long remember the scene and our conversation, which was mostly on the history of the place and its people. I remained at Gaokuch four days, strolling about and enjoying the delightful climate. The elevation is about 6,800 feet. The sun at noon is powerful, but more endurable than at Simla or Murree. The water which irrigates the plateau descends from a spring high up a valley to the south, at the head of which valley is the range of mountains which divides Yassin, Tangyr, and Gaokuch. The supply sometimes fails in dry seasons, there being no glaciers on the south side to feed the stream.

The people dress like their neighbours in coloured páijámas, white cotton kurtas worked over the front with a patchwork of coloured cloth; the caps are either the Yassin kuláhs, or else the bag cap used by all the Gilgitís or Botés. Just below on the river's edge is a small patch of soil, from which they extract salt by boiling the earth in water.

Tobacco, salt, and iron, are the three articles of which these countries are most in want. If an iron mine were to be discovered, as no doubt it will be some day, the status of the whole people would be raised thereby, and a great impetus be given to the industries of a naturally hard-working people.

Faqrís and pírs, or saints, both beg and rob the people. I saw a case of a fine strong faqir with five muríds, chelás or disciples, who used to go about sometimes mounted, at other times on foot, and beg all they could, and occasionally, if they found an opportunity, would take by force food, clothing, ponies, goats, fowls, &c., giving in exchange *ta'wíz*, or charms, against illness, the evil eye, ill-luck, and love charms.

One peculiarity in the dress of these people is the use of the brooch. It is made of different sizes and shapes, but generally a ring with a needle attached to one side. Ivory, mother-o'-pearl, brass, and silver, are used in their construction. Both sexes wear them, the women to fasten their chogas together, the men to hang on their charms. It is curious to see these charms sewn up in little bags, dangling from whatever part of the body they are supposed to affect, head, shoulders, arms, &c. Although saltpetre is universally found, they do not understand how to purify it. Sulphur is found in Nagyr and Hunza, and is sold in round cakes by weight. Gunpowder is made by all who have guns, in their own houses, by their own hands, no regular manufacturer makes it

exclusively. It is of a very weak description, about four times our English charges being put into the gun, *viz.*, 10 drams of theirs to $2\frac{1}{2}$ of mine. The proportions used are as followed: Nitre, 5 parts; sulphur $\frac{1}{2}$ part; charcoal 1 part = $6\frac{1}{2}$ parts.

During summer all the ponies and cattle are sent up to the grazing grounds in the Hills, but in winter, which is long and severe, all animals are housed, fodder being collected during the autumn for their use, grass and the leaves of most trees.

Donkeys have lately been introduced in Gilgit and Panyal. The Dogra Force, which attacked and massacred the people of Yassin in 1863, brought down several with them. They are small, quite black, without the usual stripe down the back and shoulders, but have a white nose; they are used in the gardens for carrying loads of earth, manure, or in harvesting crops, but are not ridden.

All the cloth, iron, drugs, &c., which find their way into the Gilgit valley are brought up by the Koli and Palas men from the unknown banks of the Indus, which river runs through Yagistán, or Independent territory, from Ráwal Pindí in the Panjáb *viá* Koli through Chilas. The loads are of 60 lbs. each, carried throughout by men, who are paid 30 Kashmír chilkís, of 8 annas each, for the trip up to Gilgit. Little or no merchandise reaches these parts through Kashmír, owing to the excessive taxation and bad roads.

I returned to Srínagar by the main road through Gurais and the Kumrí Pír Pass, having had very little sport, though the country is full of it, owing to the season being too late for shooting.

I can recommend Gilgit as a field for sportsmen, especially if they take no Kashmírí shikáris, as the latter spoil the whole country and are quite unnecessary, the Gilgitís being keen shikáris themselves.

~~~~~



*On the Ghalchah Languages (Wakhí and Sarikolí).—By R. B. SHAW,  
Political Agent, late on special duty at Káshghar.*

The dialects of which a brief sketch is here given, are spoken in valleys which descend to the east and west respectively from the Pamir plateau. They are members of a group of kindred dialects which prevail about the head waters of the Oxus; the *Sarikolí* being the only one of them whose home is on the east of Pamir, on one of the affluents of the Yárkand river. The inhabitants of Koláb, Macha, Karátigin, Darwáz, Roshán, Shighnán, Wakhán, Badakhshán, Zeibak or Sanglich, Minján, &c., (see maps) are all classed by their Turkí neighbours under the general designation of GHALCHAH; they are mostly Shí'ah Musalmáns, and speak either Persian or other kindred dialects. "Such evidence as we have, confirmed by the general report of the nations round, ascribes (to them) a Tájik (*i. e.*, an Iranian) origin."\* Now the Tájiks form the substratum of population all over Western Turkistán, where, as well as in Persia, the Iranians are intermixed with and dominated over by Turkish tribes. To us, the Tájiks represent the earliest inhabitants of the regions occupied by them, for the Turanians now settled there are of later introduction; and no recognisable trace of any pre-Aryan population is to be found there.

The Tájiks of the plains speak their own form of Persian, differing merely in pronunciation and in a few peculiarities from the language of Irán. The Badakhshís are said to have only adopted that language within the last few centuries, having formerly spoken a dialect of their own, probably a mere *patois* of Persian whose peculiarities gradually gave way before a freer intercourse with their neighbouring kindred.

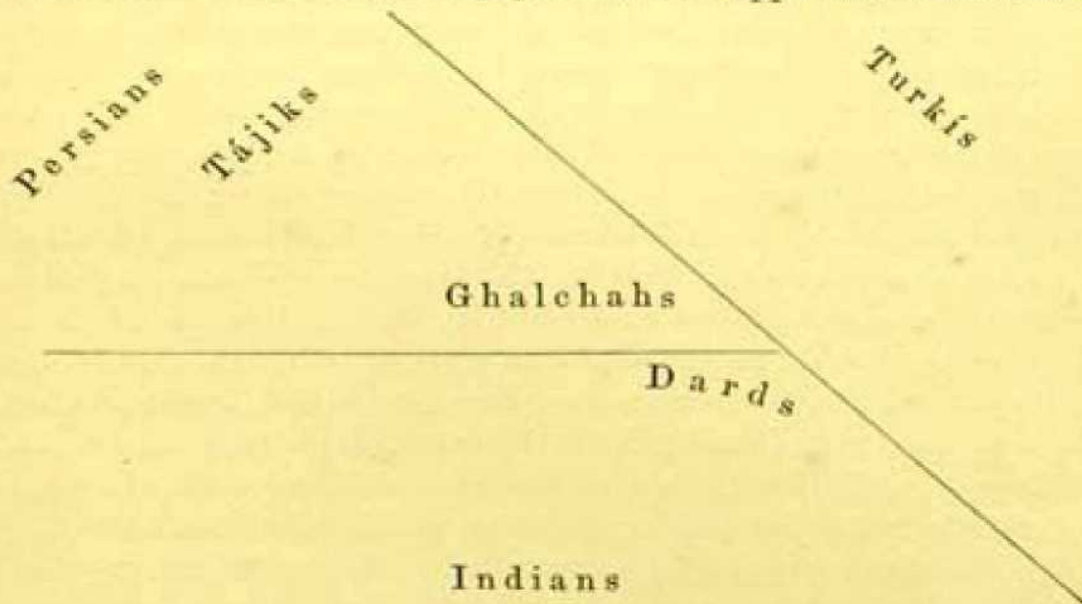
There remain the more secluded tribes of the higher valleys, south and east of Badakhshán, also of Aryan race and of the Persic branch. A glance at their vocabularies will prove this: but in order to show that these dialects are not mere offshoots or corruptions of modern Persian (notwithstanding the numbers of Persian words which they have adopted), I have collected a list of words which seem to have a closer connection with the early eastern form of Persian, Zend, and even with other Aryan tongues.†

\* Wood's Oxus, ed. 1872. Col. Yule's Essay, p. xxiii.

† Thus the Zend *maidhyána* can never have passed through the Persian form *miyán*, to make the Ghalchah word *madhán* (middle). Nor the Zend syllable *raésha* have had its two vowels *a é* blended into one in the Persian word *rúsh* on its way to the Ghalchah form *reghish* (beard). The Gh. *māi* is derived from Zend *maésha* in a different way from the Persian *mesh* (sheep), not through it. See Comparative List of Words.



History tells us nothing of their arrival in their present seats, nor whence they came. Their own traditions, as far as we know, are equally silent; but perhaps their language may afford some indications. With this view it is necessary to consider their geographical position. If a line be drawn transversely across the paper from the upper left hand corner towards



the lower right hand corner, this will represent a portion of the Himálaya-Pamír water-parting. If then on the left of this we draw a horizontal line falling on the former at an angle, we shall have a rough representation of the Hindú-Kush water-parting in its relation to the other. The tribes which we are considering live in the acute angle north of the Hindú-Kush spur; while in the obtuse angle which forms its supplement dwells another group of tribes called the *Dards*. Beyond the Pamír mountains live the Turkís of Káshgharia.

With the latter of course the Ghalchahs have no connection of speech. And, if they were simply the foremost tribes of an eastward migration of the Persic race we should expect their language to have no closer radical connection with that of their other neighbours, the Dards, than that of their supposed parents the Persians or Tájiks has. There might have been an interchange of words during the centuries that they have dwelt in one another's neighbourhood; but grammatical connection can only exist where there is previous linguistic affinity and (roughly) in proportion to its closeness.

If, moreover, the Dards were similarly an offshoot from the Hindu race (sent up into the mountains after the settlement of the latter in India), then as we know that the tongues of Persians and Hindus have diverged from a common original, each successive offshoot from either would probably get further and further apart in point of language. As Persian and Hindí



are sisters, Ghalchah and Dardu would then be cousins, and we should expect to find this more distant relationship typified in their speech.

It is therefore interesting to compare the Ghalchah with the Dard dialects. Isolated words may creep into a language at any time, especially when new ideas or inventions reach a rude people from a more civilized one. It will be seen, however, from a list which I have collected, that the words which resemble one another in Ghalchah and Dardu convey the most simple and fundamental ideas. But it is to a comparison of grammatical forms that we must look for a measurement of the degree of affinity that exists between them.

First, with regard to the declension of the Noun. Here the Ghalchah dialects are almost bare of inflection, the cases being chiefly marked by separable pre-positions and post-positions. But the one termination of an oblique case which is not so separable (in the Wakhí dialect), occurs also as a Dardu inflection. In the Wakhí Instrumentative and Ablative cases, the termination *an* is used in addition to the appropriate preposition; as in Latin (e. g. *cum viro*). There is also a Genitive absolute with the same termination, which may possibly be a relic of its general use for the Genitive case, e. g., *zù-i-an*, mine, *Mír-an*, "the king's."

Now, taking Dr. Leitner's work as the most complete account we have of the *Dardu* dialects, we find in the *Arniya* form (or that spoken in the valleys adjoining Wakhán on the south of the Hindú-Kush water-parting), the same termination *an* used for all the oblique cases of the Plural. It is not used in the Singular, but still it is distinct from the proper termination of the Plural, as will be seen below.

| GHALCHAH (Wakhí).          | ENGLISH.         | DARDU (Arniya).                    |
|----------------------------|------------------|------------------------------------|
| Nom. S. <i>mír</i>         | a king           | Nom. S. <i>mitèr</i> .             |
| Nom. Pl. <i>mírisht</i>    | kings            | Nom. Pl. <i>mitèrann</i> .         |
| Gen. „ <i>mírav (AN)</i>   | of kings         | Gen. „ <i>miteránAN</i> .          |
| Dat. „ <i>mírav-ar</i>     | to kings         | Dat. „ <i>miteranAN-té</i> .       |
| Acc. „ <i>mírav</i>        | kings            | Acc. „ <i>miteranAN</i> .          |
| Instr. „ <i>da míravAN</i> | with or by kings | Instr. „ <i>miteranAN-somega</i> . |
| Abl. „ <i>sa míravAN</i>   | from kings       | Abl. „ <i>miteranAN-sar</i> .      |

It will be seen that the Dardu noun has preserved the termination *an* in other oblique cases where it has been lost or has never existed in Wakhí; on the other hand the Wakhí has got it in the Singular as well as in the Plural. The fact of the Plural affix in *Arniya* being also *an* (as *av* is in Wakhí) need make no confusion; but for clearness' sake I also give the plural of a Pronoun where this possible ambiguity does not exist.



| GHALCHAH (Wakhi).        | ENGLISH.  | DARDU (Arniya).     |
|--------------------------|-----------|---------------------|
| Nom. Pl. <i>yàisht</i>   | they      | <i>hami</i>         |
| Gen. „ <i>yàc</i> (AN)   | of them   | <i>hamitan</i>      |
| Dat. „ <i>yà'-ar</i>     | to them   | <i>hamitan-te</i>   |
| Instr. „ <i>da yàvAN</i> | by them   | <i>hamitan-nase</i> |
| Abl. „ <i>sa yàvAN</i>   | from them | <i>hamitan-sar</i>  |

Where the *t* would seem to be merely euphonic to save the meeting of two vowels.

Thus in both languages the termination *an* has become a merely formal one for some or all of the oblique cases, but requiring to be re-inforced by prepositions or postpositions. It was probably once significative, and may have been the mark of some primitive case which did duty for all the various objective relations of nouns, until a want was felt for greater precision which was attained by superposing special affixes and prefixes.\*

Passing on from this general oblique inflection to the particular cases, we find that the *Genitive* in the Ghalehah dialect under notice is formed merely by the apposition of the noun (in its oblique form if any) to another noun. In some of the Dardu dialects the same seems to be the rule, though others have a special genitive form :

| ARNIYA.                                  | ENGLISH. | ARNIYA.                                | ENGLISH.   |
|------------------------------------------|----------|----------------------------------------|------------|
| Nom. <i>sorum</i>                        | gold     | <i>miter</i>                           | a king.    |
| Obl. <i>sormo</i> { <i>-te</i> to } gold |          | <i>mitaru</i> { <i>-te</i> to } a king |            |
|                                          |          | { <i>-sar</i> from }                   |            |
| Gen. <i>sormo</i>                        | of gold  | <i>mitaru</i>                          | of a king. |

| ARNIYA.                                                             | ENGLISH.           | KHAJUNA.          |
|---------------------------------------------------------------------|--------------------|-------------------|
| Nom. <i>miteránn</i>                                                | kings              | <i>thamó.</i>     |
| Obl. <i>miteranan</i> { <i>-te</i><br><i>-somega</i><br><i>-sar</i> | to<br>with<br>from | kings (also Acc.) |
| Gen. <i>miteranann</i>                                              | of kings           | <i>thamó</i>      |

|                                   |               |
|-----------------------------------|---------------|
| Nom. <i>host</i>                  | a hand        |
| Obl. <i>hosto</i> (Acc. and Abl.) | { a hand      |
|                                   | { from a hand |
| Gen. <i>hosto</i>                 | of a hand     |

| KALASHA.                               | ENGLISH.  | KALASHA.                                | ENGLISH.  |
|----------------------------------------|-----------|-----------------------------------------|-----------|
| Nom. <i>sha</i>                        | a king    | <i>motsh</i>                            | a man     |
| Obl. <i>sháas</i> (Dat. to (or from) a |           | <i>motshes</i> (Dat. and to (or from) a |           |
| and Abl.) king                         |           | Abl.) man                               |           |
| Gen. <i>sháas</i>                      | of a king | <i>motshes</i>                          | of a man. |

So also with the Pronouns.

\* Prof. M. Müller shows that several genitives and datives were originally locatives



ARNIYA.

|                                                                         |       |                                                                    |         |                                                                     |        |
|-------------------------------------------------------------------------|-------|--------------------------------------------------------------------|---------|---------------------------------------------------------------------|--------|
| Nom. <i>awicá</i>                                                       | I     | <i>tu</i>                                                          | thou    | <i>hé</i>                                                           | he     |
| Obl. <i>ma</i> { <i>-te</i> to<br><i>-nase</i> by<br><i>-sar</i> from } | me    | <i>ta</i> { <i>-te</i> to<br><i>-nase</i> by<br><i>-sar</i> from } | thee    | <i>ha-</i> { <i>-te</i> to<br><i>-nase</i> by<br><i>-sar</i> from } | him    |
| Gen. <i>ma</i>                                                          | of me | <i>ta</i>                                                          | of thee | <i>hato</i>                                                         | of him |

In all these, it will be seen, the Genitive is merely the oblique form stripped of the special affixes or prefixes of other cases. It is the same in the Ghalchah dialects; compare the following pronouns of Sariḳolí which possess separate oblique forms:

SARIḲOLÍ.

|                                                                          |       |                                                                     |         |                                                                     |        |
|--------------------------------------------------------------------------|-------|---------------------------------------------------------------------|---------|---------------------------------------------------------------------|--------|
| Nom. <i>waz</i>                                                          | I     | <i>táo</i>                                                          | thou    | <i>yū</i>                                                           | he     |
| Obl. <i>mu</i> { <i>-ar</i> to<br><i>-its</i> by<br><i>&amp;c.</i> &c. } | me    | <i>tū</i> { <i>-ar</i> to<br><i>-its</i> by<br><i>&amp;c.</i> &c. } | thee    | <i>wi</i> { <i>-ar</i> to<br><i>-its</i> by<br><i>&amp;c.</i> &c. } | him    |
| Gen. <i>mu</i>                                                           | of me | <i>tū</i>                                                           | of thee | <i>wi</i>                                                           | of him |

But the rule holds good throughout, even when, as in the case of substantives, the (singular) oblique cases have no form distinct from the nominative.

The *Dative* in the Ghalchah dialects is formed by the post-position *ar* or *ir*. This also occurs in one of the Dardu dialects, the Khajuna. Compare:

| GHALCHAH (Wakhi and Sariḳoli). |       | DARDU (Khajuna). |        | ENGLISH.  |
|--------------------------------|-------|------------------|--------|-----------|
| Nom. Sing. <i>mír</i>          | میر   | <i>thám</i>      | تھام   | a king    |
| Dat. „ <i>mír-AR</i>           |       | <i>thám-ER</i>   |        | to a king |
| Nom. Pl. <i>mírav</i>          | میرو  | <i>thámó</i>     | تھامو  | kings     |
| Dat. „ <i>mírav-AR</i>         | میرور | <i>thámó-'R*</i> | تھامور | to kings  |

So also the Khajuna Pronouns:

|                   |       |              |         |              |        |
|-------------------|-------|--------------|---------|--------------|--------|
| Nom. <i>gyé</i>   | I     | <i>umm</i>   | thou    | <i>in</i>    | he     |
| Dat. <i>gyár</i>  | to me | <i>umár</i>  | to thee | <i>inner</i> | to him |
| Nom. <i>mí</i>    | we    | <i>uwé</i>   | they    |              |        |
| Dat. <i>mimAR</i> | to us | <i>uwERR</i> | to them |              |        |

The *Accusative* in the Dard dialects has no appropriate termination or affix, but consists of the bare noun either in its nominative or its oblique in Greek, Latin, French, &c., and quotes in a foot note the statement that 'the Algonquins have but one case, which may be called locative.' Lectures in the Science of Language, vol. I, pp. 250. Ed. 1866.

\* In Dr. Leitner's work this stands as *thanór*, but the *n* is probably a misprint for *m*.



form. So also in Ghalchah (Wakhí) for this case the noun is often used without any special mark, though occasionally the syllable *a* is either prefixed or affixed.

The *Ablative* and *Instrumental* cases have been already mentioned. The inflectional termination is the same for both groups. The only post-positions or pre-positions in these cases that can be compared are: *katti* in Sariḳolí, and *kath* in Khajuna, meaning *with*, and perhaps *sa* (or *tsa*) in Wakhí with the Khajuna *tzum*, meaning *from*.

We now come to the VERB. The two forms of the *Infinitive* (*oki* and *ono*) in the Shina (Dard) dialects, appear to correspond with the two forms in Wakhí (*ak* and *an* or *in*), which, however, have lost the final vowel.

### INFINITIVES.

| ENGLISH.             | DARDU.         |                 | GHALCHAH.      |
|----------------------|----------------|-----------------|----------------|
|                      | Gilgití.       | Astorí.         | Wakhí.         |
| to die .....         | ...            | <i>miri-óNO</i> | <i>mara-IN</i> |
| to say or tell ..... | <i>ray-OKI</i> | ...             | <i>khan-ÁK</i> |
| to cook .....        | ...            | <i>paj-óNO</i>  | <i>pöch-AN</i> |
| to do .....          | <i>toki</i>    | ...             | <i>khÁK</i>    |

The Kalasha form of Dardu also has an Infinitive resembling that of the Wakhí in *ak*, e. g. *on-ik* "to bring", *dek* "to give", *jagá-ik* "to see", *kar-ik* "to do", *mond-ek* "to say, &c.

The Infinitive in Dardu seems to be declined as a verbal noun, as in the Ghalchah dialects, e. g. *toki djo* "from doing".

The whole of the inflectional part of the Ghalchah *Verb-conjugation* is effected by means of two sets of personal terminations, of which one set is used for the Future Present, and the other for the Past Tenses. The former set may be thus compared with the terminations of the same Tense in the Dardu (Shina):

| ENGLISH.           | DARDU.                     |                       | GHALCHAH.           |
|--------------------|----------------------------|-----------------------|---------------------|
|                    | Shina.                     | Wakhí.                | Sariḳolí.           |
| I go or will go... | <i>mu boy-UM</i>           | <i>waz rach-AM</i>    | <i>waz só-'M</i>    |
| thou &c. ....      | <i>tu boy-E</i>            | <i>tu rach-I</i>      | <i>táo só</i>       |
| he &c. ....        | <i>jo boye or boyey</i>    | <i>yáo rach-d</i>     | <i>yü sau-d</i>     |
| we &c. ....        | <i>be boy-ON or bôn</i>    | <i>sak rach-AN</i>    | <i>másh só-'N</i>   |
| ye &c. ....        | <i>tzo boy-ET</i>          | <i>sāisht rach-IT</i> | <i>tamásh só-ID</i> |
| they &c. ....      | <i>je boy-IN or boy-EN</i> | <i>yaisht rach-AN</i> | <i>wodh só-IN</i>   |

This remarkable similarity between the personal terminations of the Future-Present Tense in the two groups of dialects, does not extend to the



other set of terminations (those of the Past Tenses) which are very peculiar in Wakhi and Sariqoli.

Thus, to sum up, we have discovered similarities between the two groups of dialects, as regards the noun declension; 1st in the mode of expressing the Genitive (by simple apposition), 2nd the Dative (by the affix *ar*, *er*), 3rd the Accusative (a negative resemblance), 4th the Instrumental and Ablative (by means of a termination *an* in addition to the appropriate pre- or post-positions, which themselves are in two instances alike). The Nominative can afford no evidence either way. Only in the remaining prepositions and post-positions used with the cases can no resemblance be traced, as well as in the special terminations which give a plural sense. Thus by far the greater part of the noun declension in Ghalchah has parallels amongst the Dardu dialects.

Again in the conjugation of the verb, we have seen that 5 out of the 6 personal terminations of the Future Present Tense are similar in Dardu (Shina) and in Ghalchah; while the Wakhi Infinitive meets with a pretty close parallel in Kalasha (Dardu), and both its forms seems to be the same as those of the Shina (Dard) dialect, merely dropping the final vowel of these.

The resemblances therefore cover pretty nearly half the inflections of the Wakhi verb; and the differences occur in the remaining set of personal terminations (used for the Past Tenses), as also in the Participles.

The resemblances in the vocabulary represent the most simple and organic ideas (see Comparative Table).

This radical similarity between the Ghalchah and the Dardu groups of languages, so far as it goes would seem to show that the present local connection of these two groups cannot be the result of movements starting from opposite quarters and meeting accidentally in the present homes of the tribes in question. If Ghalchahs and Dards were offshoots detached respectively from the Persic and Indic races at a period when the languages of those two races had already assumed their present distinct types, they could scarcely, in their isolated valleys, severed from one another by snowy ranges, have worked back their dialects in the direction of primitive unity. This would have been reversing the natural course of events.

We must therefore suppose that the ancestors of the Ghalchahs and Dards at one time lived together and spoke much the same language, although their dialects have since diverged; and although that divergence is precisely of such a nature as to bring one group into the Persic class and the other into the Indic, notwithstanding a strong mutual resemblance. The water-parting of the Hindú-Kush range which divides Ghalchahs from Dards, also forms the speech-parting between the Persic and Indic tongues; and the long valleys on the south of that range contain a trail of Aryans pointing



as plainly towards India, as those on the north do towards that greater Persia which comprises all Persian-speaking races from the Jaxartes to the mountains of Kurdistan.

But further, as the discovery, in undisturbed soil, of a skeleton with all its parts lying together in their proper relative positions, proves to the geologist that the body of which it is the remains must have been deposited there at, or soon after, death, and consequently that the habitat of the living animal must have been near; similarly the present position of the Dard and Ghalchah tribes on either flank of the speech-parting Range of Hindú-Kush,—bound together by dialectic ties, and yet attached also in the same way to the neighbouring nations, the Persic limb lying towards the Persian side, the Indic limb towards the Indian side,—would seem to shew that the early home of their unity cannot have been far off. Had they divided asunder in some distant land, what probability was there of their coming together again in one locality, and of their finally taking up relative positions precisely corresponding with their respective linguistic affinities?

The connection of the Ghalchah hill-tribes with the Badakhshís and of these again with the Tájiks or Iranian population of Central Asia, is so plain that it is recognised by all the natives of those regions. On the other hand the Dards, whose languages are classed as decidedly Indian or Sanskritic by Dr. Leitner, extend from the axis of the Hindú-Kush Range down to and across the Indus. In the valleys of Guraiz and Tilél they overlap or intermingle with the Kashmírí race, from which again an unbroken chain of dialects has been traced out by Mr. Drew\* through the outer Himálaya valleys, connecting by a gradual passage the Kashmírí with the Hindí spoken in the plains of India.

It is not alone in the extreme eastern section of the Hindú-Kush that a speech-parting of the kind described above exists. If, as is probable, the Siabpòsh Káfirs are merely unconverted Dards, they are matched on the north by the Ghalchah inhabitants of the valleys of Mínján, Sanglich, &c., and the linguistic water-parting coincides with the geographical one, at least as far west as the Khawák Pass above Kábul.

Thus in the same way that, *philologically*, the Indian and Persian tongues have been traced back through ancient writings into such mutually resembling forms of speech as to imply original unity; so, *geographically*, we can at the present day follow up from either end a chain of Indic and Persic tribes until we find the last links of each fixed close together on the flanks of the Hindú-Kush Range, and connected with one another by linguistic ties.

Whether this distribution is of so early a date as to indicate the line of the original migrations of the Aryans on their way to India I leave to

\* See his "Jammu and Kashmir", p. 467.



abler heads to determine ; but it seems probable that the separation of the Dards from the Ghalchahs took place at a time when there still existed a spoken tongue neither distinctly Indian nor distinctly Persian but containing the germs of both. If the Dardu immigration from the north had been a late one, (say at the time of the Yuéchi or of the Musalmán invasions) at a time when the language spoken in the plains of Bactria had become almost as strongly differentiated from that of India as at the present day,—it is not easy to see how the speech of the Dards could have taken its development on Indian lines, as it has done ; and *vice versa*. The fact of the tongues under notice still retaining so much mutual resemblance, together with a local connection, would imply that they were descended directly from one and the same mother ; while the fact of their belonging to the opposite families shows that we must not seek their common parentage either in the Indian or in the Persian tongue, but in an early Indo-Iranian mother dialect, which alone would be capable of giving birth to two such children from the same womb. To put the matter in other words, it would seem that the Ghalchah and Dard nations must have lived each a life of its own, distinct from that of any other branches of the Aryan race and changing less fast than they, ever since they emerged from the oneness of the Indo-Iranian stem. They are true sisters, and yet they belong to rival families. Hence they must be of that generation in which the split occurred. In any lower generation they would either not be sisters, or, if they were, they would belong to the same branch of the family. No Spanish Bourbon has been brother to a French Bourbon since the generation in which the distinction first arose.

Again, if the Dards were admitted to have come down across the Hindú-Kush in those early days, but the Kashmíri and outer Himálayan populations were supposed to be a reflex wave of migration sent up by the Indo-Aryans after their arrival and settlement in India, what a gap we ought to have between the dialects of the Dards and those of these later comers into their neighbourhood, a gap representing the whole progress in language made between the time when the Indo-Aryans were still a mere Central Asian tribe with incipient peculiarities of speech, and that when, their great migration accomplished, they were in possession of their Sanskrit form of language. A gap certainly does appear to exist, but I am not able to judge whether it is a sufficiently broad one, or whether later inquiries may not fill it up as the gap between Kashmíri and Panjábi has been filled by Mr. Drew's researches.

Max Müller tells us : “ Before the ancestors of the Indians and Persians started for the South, and the leaders of the Greek, Roman, Celtic, Teutonic, and Slavonic colonies marched towards the shores of Europe, there was a small clan of Aryans settled probably on the highest elevation of



Central Asia [the Western slopes of the Belortagh (Pamir), near the sources of Oxus and Jaxartes.] After this clan broke up, the ancestors of the Indians and Zoroastrians must have remained for some time together in their migrations or new settlements." [Max Müller's *Lectures on the Science of Language*, Vol. I, pp. 238. Ed. 1866.]

Perhaps to this we may hereafter be able to add something like the following:

After a long settlement in and about fertile Badakhshán (during which slight differences of speech sprung up between south and north), the further disruption took place. The southern section of the Indo-Iranian clan poured over the Hindú-Kush water-shed by successive waves into the long valleys of the Kunér, Panjkorah and Gilgit rivers (perhaps also of others further west) which lead down towards the Indus. Arrived in the broad plains of the Panjáb, where the conditions were favourable to expansion, they increased in numbers and civilization, developing out of the dialect which they had brought with them the rich structure of Sanskrit. The northern section of the clan, left behind in Badakhshán and increasing in their turn, expanded westward and northward, and also closed up behind their departing brethren into the valleys on their own side of the Hindú-Kush, pushing the hindmost of the Indo-Aryans across into the heads of the valleys on the south. In the plains of Bactria and of Irán the dialectic differences which had perhaps begun to exist before the departure of their southern kinsmen, developed into Zend and early Persian; while those fragments of either branch which were left high and dry in the valleys on both sides of the Hindú-Kush, isolated from the main bodies of the Persians and Indians respectively, were less affected by the linguistic tendencies of their more civilized and numerous brethren; their speech changed in a less rapid ratio, and moreover they had been the latest to divide asunder; and thus their dialects retain to the present day a much closer mutual resemblance than do the languages of the two great nations whose ancestors once dwelt with theirs. As the forefathers of the Indian and Persian races remained longest together of all the Indo-European tribes, and their languages show consequently the closest mutual affinities of all the great divisions of the Aryan family; so also among the minor tribes of those two sister races, the Ghalchahs and Dards appear to have remained together longer than the rest of their kindred, and their dialects consequently show greater coincidences than any other two which can be picked from both sides of the border between Indian and Persian speech.



### The Sounds

#### And their Representations.

The dialects of Sariḳol and Wakhán are not found in a written form. They exist only as spoken by the people. For all literary purposes Persian is used by those who have sufficient education to know how to read and write.

Many of the sounds in the spoken dialects of Sariḳol and Wakhán are different from any that can be expressed by the ordinary Arabic letters. To employ these in representing Sariḳolí and Wakhí words, it would be necessary to adopt a considerable number of conventional signs. As this may be just as accurately done with Roman characters, I shall confine myself to the latter in the following pages, instead of forming an adapted oriental alphabet for this purpose.

The accented *ā* will be used for the Central Asian broad sound resembling that of *aw* in the word *pawn*.

The *à* (with a grave accent) will represent the Italian sound as in *farà*.

The unaccented *a*, for the short oriental sound as in 'America', 'woman,' 'oriental,' 'ordinary,' &c.

The vowel *e*, for its sound in the English word *then*.

The same accented, *è*, will rhyme with the English word *may*.

Unaccented *i* as in *him*.

Accented *í* or *î* as in *machine*.

Unaccented *o*, as in the German word *Gott*.

Accented *ó* or *ô*, as in English *go*.

Dotted *ö*, as in German *schön*.

Unaccented *u*, as in German *hund*.

Accented *û* or *ú*, as in English *rumour*.

Dotted *ü*, as in German, *mühe*.

Diphthong *ai* as in *mitraille*; *ei* as *réveille*; *au* and *ao* pretty nearly as in German *frau* and English *now*.

The ordinary consonants need not be separately mentioned. The following forms however require description:

The compound *th* represents the hard sound of the English *th* in the word *thing*.

The compound *dh* represents its soft sound in the word *the*.

The accented *z* represents the French sound of the consonant in *je*, or the *z* in the English word *azure*.

*Sh* is to be pronounced as in English (same as French *ch* in *chose*, or German *sch* in *schön*).

*Ch* as in English (represented in French by *tch*, and in German by *tsch*).





*J* as in English (French *dj*).

*W* as in English, but always distinctly pronounced and not coalescing with the preceding vowel.

The rough German *ch* (as in *machen*) will be represented by *khh*. The softer German sound as in *ich* (more usual in Wakhí and Sariqolí) will be represented by *kh*. It is, however, a little harsher than in *ich*. There is another sound intermediate between these and an *sh*; the tongue being placed considerably further back than in the latter and the sibilant consequently coming from the back of the palate instead of from the front. This will be represented by the combination *sch*.

*Gh* is the oriental *ghain* غ. In some words of Wakhí it is softened down to the intonation of the *g* in the German word *tage*.

### Sketch of Wakhi' Grammar.

### THE SUBSTANTIVE.

There is no distinction of *Gender*. The *Plural* is formed by affixing the syllable *isht* for the Nominative and the syllable *av* for the oblique cases.

The relations of substantives are expressed either by position, or by means of significant Prepositions or Postpositions attached to the Singular or Plural form. The Ablative and Instrumentative take, besides these, a termination resembling the case-terminations in the classical languages.

The Singular has two forms ; that of the Ablative and Instrumentative, and that of the other cases. The Plural has three : that of the Nominative, that of the ordinary oblique cases, and that formed by the addition of the Ablative termination to the latter.

| SINGULAR.                                   | PLURAL.                                   |
|---------------------------------------------|-------------------------------------------|
| The house [Nom.] ..... <i>khûn</i>          | houses..... <i>khûnisht</i>               |
| the house's [Gen.] ..... <i>khûn</i>        | of houses ..... <i>khûnav</i>             |
| to the house [Dat.] ..... <i>khûn-ar</i>    | to houses ..... <i>khûnav-ar</i>          |
| the house [Acc.]..... <i>khûn</i>           | houses ..... <i>khûnav</i>                |
| or <i>khûn-a</i>                            |                                           |
| at or in the house [Loc.]... <i>da-khûn</i> | at or in houses..... <i>da-khûnav</i>     |
| on the house ..... <i>sak-khûn</i>          | on houses..... <i>sak-khûnav</i>          |
| by or with the [Instr.]... <i>da-khûnan</i> | by or in the houses... <i>da-khûnavan</i> |
| from the house [Abl.]... <i>tsa-khûnan</i>  | from houses ..... <i>tsa-khûnavan</i>     |

The Noun in the Genitive is merely placed before the governing noun without any sign ; e. g., *khân bār* "the door of the house (the house-door)".

The signs of the Dative and Accusative (*ar* and *a*) are sometimes prefixed instead of following; as *ar-bázár* "to the market."



The ADJECTIVE is not inflected. It precedes the Substantive.

An adjective can be formed from a substantive by the addition of the termination *üng* or *üng*. Ex. *rwár-üng* "belonging to a day", "daily".

### THE PRONOUN.

The Personal and Substantival Pronouns are declined as follows:—

| SINGULAR. |                                      | PLURAL.                                |      |
|-----------|--------------------------------------|----------------------------------------|------|
|           |                                      | 1st.                                   |      |
| Nom.      | <i>wuz</i> ..... I                   | <i>sak, sakisht</i> ..... we           |      |
| Gen.      | <i>zû, zûi</i> ..... my, of me       | <i>spá</i> ..... our, of us            |      |
| Dat.      | <i>mar</i> ..... to me               | <i>sak-ar</i> ..... to us              |      |
| Acc.      | <i>maž, amaž</i> ... me              | <i>sak, sak-a</i> ..... us             |      |
| Loc.      | — <i>maž</i> ..... (at, in) me       | — <i>sak</i> ..... (at, in) us         |      |
| Instr.    | } <i>maž-an</i> ... (from, with) me  | — <i>sak-an</i> ..... (from, with) us  |      |
| Abl.      |                                      |                                        |      |
|           |                                      | 2nd.                                   |      |
| Nom.      | <i>tu</i> ..... thou                 | <i>säisht</i> ..... ye                 |      |
| Gen.      | <i>ti</i> ..... thy, if thee         | <i>sav</i> ..... your, of you          |      |
| Dat.      | <i>tar</i> ..... to thee             | <i>sav-ar</i> ..... to you             |      |
| Acc.      | <i>tao, a-tao</i> ..... thee         | <i>sav, sav-a</i> ..... you            |      |
| Loc.      | — <i>tao</i> ..... (at, in) thee     | — <i>sav</i> ..... (at, in) you        |      |
| Instr.    | } — <i>tao-an</i> ..... (from, with) | — <i>sav-an</i> ..... (from, with) you |      |
| Abl.      |                                      |                                        | thee |
|           |                                      | 3rd.                                   |      |
| Nom.      | <i>yao</i> ..... he or that          | <i>yäisht</i> ..... they               |      |
| Gen.      | <i>yao</i> ..... of him              | <i>yav</i> ..... of them               |      |
| Dat.      | <i>yao-ar, yaor, yâr</i> to him      | <i>yavvar, yaisht-ar</i> ..... to them |      |
| Acc.      | <i>yao, a-yao</i> ..... him          | <i>yáv</i> ..... them                  |      |
| Loc.      | { — <i>yao</i> ..... (at, in) him    | — <i>yáv</i> ..... (at, in) them       |      |
|           | { <i>sikao</i> * ..... on him        |                                        |      |
| Abl.      | <i>sánan</i> ...* ..... from him     | <i>yá'n, —yáv-an</i> ..... (from) them |      |
|           | — <i>yá'n</i>                        |                                        |      |

### REFLECTIVE PRONOUN.

(Singular and Plural.)

|        |                          |                                       |
|--------|--------------------------|---------------------------------------|
| Nom.   | <i>khat</i> .....        | he himself, she herself, &c.          |
| Gen.   | <i>khü</i> .....         | of himself, &c. ; his, her or its own |
| Dat.   | <i>khat-ar</i> .....     | to himself, &c.                       |
| Acc.   | <i>khat</i> .....        | himself, &c.                          |
| Loc.   | — <i>khat</i> .....      | (at, in) himself, &c.                 |
| Instr. | } — <i>khat-an</i> ..... | (from, with) himself, &c.             |
| Abl.   |                          |                                       |

\* Here the preposition is incorporated with the pronoun (*sikao* for *sak-yao*, *sánan* for *sa yáo-an*).



## ADJECTIVAL PRONOUNS.

(Singular and Plural.)

|        |                                                                                 |                |                                                               |         |
|--------|---------------------------------------------------------------------------------|----------------|---------------------------------------------------------------|---------|
| Nom.   | <i>yem</i> .....                                                                | this or his    | <i>yà</i> .....                                               | that    |
| Gen.   | <i>yem</i> .....                                                                | of this or his | <i>yà</i> .....                                               | of that |
| Dat.   | { <i>aram</i> *, <i>dram</i> }<br>or <i>tram</i> or<br><i>yem</i> — <i>ar</i> } |                | to this or his <i>drà</i> or <i>yà</i> — <i>ar</i> ...to that |         |
| Acc.   | <i>yem</i> .....                                                                | this or his    | <i>yà</i> .....                                               | that    |
| Loc.   | { <i>dam</i> * or <i>tam</i> .....at, in, &c.,<br>this or his                   |                | <i>dà</i> .....at, in &c. that                                |         |
|        | { <i>sakam</i> * .....on, on ac-<br>count of, &c., this or his                  |                | <i>sakao</i> .....on, on account<br>of &c. that               |         |
| Instr. | { <i>tsaman</i> * or <i>saman</i> from this                                     |                | <i>tsanan</i> or <i>sanan</i> .....from that                  |         |
| Abl.   | { or <i>sam</i> — <i>an</i> ...from his                                         |                | ( <i>tsa-yan</i> )                                            |         |

EMPHATIC : *ha-yem* "this very", *ha-ya* "that very".

Other pronouns, such as *chiz* "what" ? *koi* "who" ? *tsum* "some", *imân* "one-another", &c., are declined, when necessary, as substantives.

[Genitive absolute : *zui-AN i' charkh* = a wheel of mine ; *yao-AN i' māina* = a talking bird of his.]

There is moreover a set of personal terminations to the Past, Perfect, and Pluperfect tenses of Verbs, which are capable of being separated from the Verb to which they belong. Thus they may perhaps be looked upon as Pronouns (see Sariḳolī, p. 159).

They are :

| Singular. |                            | Plural.   |                            |
|-----------|----------------------------|-----------|----------------------------|
| 1st pers. | <i>am</i> or <i>im</i> .   | 1st pers. | <i>an</i> or <i>in</i> .   |
| 2nd       | „ <i>at</i> or <i>it</i> . | 2nd       | „ <i>av</i> or <i>iv</i> . |
| 3rd       | „ (caret)                  | 3rd       | „ <i>av</i> or <i>iv</i> . |

## THE VERB.

Every Verb appears, in its various tenses, under four *forms*, which require to be known, in each case, before it can be conjugated. These are :

(i.) The INFINITIVE form, from which are obtained a Verbal noun, the Imperfect Indicative, and two derivative verbal substantives and adjectives.

(ii.) The PRESENT form, from which are obtained the Present Future Tenses of the Indicative and Conditional, and the Imperative.

(iii.) The PAST form, from which is obtained the Past tense.

(iv.) The PERFECT form, (Perfect Participle) from which are obtained the Perfect Tenses and the Pluperfect ; also a derivative verbal Adjective and Substantive.

\* Contracted from *ar-yem*, *da-yem*, *sak-yem*, *tsa-yem-an* respectively.



The following is a description of these formations :

- (i) *a.* The Infinitive (which appears under two forms: *ák* (or '*g*') and *an* or *in* or *un*) may be considered a verbal substantive, which takes several of the Prepositions and Postpositions as well as the Ablative termination *an*. Ex. *tsa marāin-an* = than (from) dying.
  - b.* The Imperfect Indicative is formed from the Dative case of the Infinitive (considered as a verbal-substantive) by the addition of the pronominal terminations (see above), and of *tu*, the 3rd person Past Tense of the Verb "to be."
- Ex. From *chilg-ák* "to desire"; Imperfect, *chilgàk-ar am tu* (lit. to the desiring I was) "I was desiring."
- From *latsar-an* "to put"; Imperfect, *latsaran-ar am tu* "I was putting."
- c.* A derivative substantive (used also adjectively) in *kūzg*. Ex. *nasūn-kūzg* "sleepy", "sleeper." It has a future or continuative sense.
  - d.* Another derivative in *asok*, implying *fitness* or *likeness*. Ex. *kōndák-asok* "laughable."

- (ii.) *a.* The Present tense (which has also a Future application) merely adds certain personal terminations to its own proper form. The personal terminations (which are different from the separable ones mentioned under the head of Pronouns) are as follows :

|           |     |       |            |         |     |       |            |
|-----------|-----|-------|------------|---------|-----|-------|------------|
| Singular. | 1st | ..... | <i>am.</i> | Plural. | 1st | ..... | <i>an.</i> |
|           | 2nd | ..... | <i>i.</i>  |         | 2nd | ..... | <i>it.</i> |
|           | 3rd | ..... | <i>d.</i>  |         | 3rd | ..... | <i>an.</i> |

[These have a great resemblance, especially in the Plural, to those of the same tense in the Shina dialect of Dardu, which are :

|           |     |       |            |         |     |       |                           |
|-----------|-----|-------|------------|---------|-----|-------|---------------------------|
| Singular. | 1st | ..... | <i>um.</i> | Plural. | 1st | ..... | <i>on.</i>                |
|           | 2nd | ..... | <i>e.</i>  |         | 2nd | ..... | <i>et.</i>                |
|           | 3rd | ..... | <i>ey.</i> |         | 3rd | ..... | <i>in</i> or <i>en.</i> ] |

Ex. Present form: *vín*; Pres. Tense: *vín-am* "I see" or "am about to see", &c.

Pres. form: *chàlg*; Pres. Tense: *chàlg-am* "I desire" or "am about to desire", &c.

Sometimes the syllable *ap* is prefixed or affixed to the Present Tense, when it is used with a Future application. Ex. *vínam-ap* or *ap vínam* "I shall see."

- b.* The Present Conditional is formed from the Present Indicative by affixing *ó* to each of the persons. However, the 1st person singular seems often to be used in its Indicative form, and the 2nd person singular loses its terminational vowel. See Conjugation.\*

\* It refers to all times not earlier than the present moment, and so includes all the



c. The Imperative is taken from the Present Tense of the Indicative, merely dropping the terminational vowel in the 2nd person singular, but retaining the termination in the 2nd person plural. The singular imperative is therefore simply the Root-form of the Present.

(iii.) The Past tense is formed by adding the separable terminations or pronouns to its own proper form :

Ex. Past form : *chàld* ; Past tense : *chàld-am* "I desired."

The 3rd person singular, having no special pronoun-ending, takes the termination *ei*, as do also the other persons when their pronominal terminations are separated from them or prefixed.

E. g. *chàld-ei* "he desired

*am chàld-ei* "I desired."

(iv.) a. The Perfect Tense similarly adds the separable terminations or pronouns to its own proper form.

Ex. Perfect form : *chilgetk* ; Perf. Tense : *chilgetk-am* "I have desired," &c.

Perf. form : *lakartk* ; Perf. Tense : *lakartk-am* "I have put," &c.

b. The Pluperfect is obtained from the Perfect Part. by rejecting the last letter of that form, excepting when it ends with *g*, and adding the syllable *tiw* (or *tiüv*) together with the separable terminations :

Ex. Perfect form : *chilgetk* ; Pluperfect Tense : *chilget-tiw am* "I had desired."

Perf. form : *ksheng* ; Plup. Tense : *ksheng-tiw am* "I had heard."

[N.B.—This affix is perhaps for the Past tense of the auxiliary "to be" (which see). Thus *chilget-tiw am* for *chilgetk-tü am* = "I was having desired" = "I had desired."]

c. The Perfect Conditional is formed from the Perfect Participle by adding the several persons of the Present Conditional of the Verb "to be."

Ex. *chilgetk hümiām* "if I had desired", lit. "if I am having-desired."\*

The Pluperfect Indicative is sometimes used instead of this Tense.

The syllables *sa* and *ki* are sometimes prefixed, in order to give a subjunctive or conditional sense.

d. A Verbal adjective is also obtained from the Perfect Participle by the addition of *ung*, *üng*, or *eng*.

Ex. *chilgetk-üng* "which has desired" or "is desired" or "has been desired."

English expressions : "if I were to desire," "if I should desire," "if I were desiring," "if I shall desire," "if I desired," &c.

\* This refers to all times earlier than the present moment, and thus includes the English expressions : "if I have desired," "if I had been desiring," &c.



[When there are separate forms of the Verb for the Active and Passive Voices, there is not this ambiguity of application about the Verbal adjective.

E. g. *schkōtk-ung* "which has broken" (trans.)  
*schkōng-ung* "which is broken."

This form is also frequently used as a substantive.

Ex. *rasang-ung* "a cut or notch", from *rasudh-an* "to cut."

### CONJUGATION OF THE VERB "TO DESIRE."

I. Infinitive form: *chilg-àk*; II. Present form: *chàlg*; III. Past form: *chàld*; IV. Perfect form: *chilgetk*.

Verbal Substantive, Nom. Gen. and Acc. *chilgàk* "the desiring or "to desire."

Dative: *chilgàk-ar* "to the desiring" or "for to desire."

Ablative: *sa-chilgàkan* "from desiring" or "than desiring," &c.

Derivative Substantives and Adjectives:

Future Present: *chilgàk-kūzg* "who desires" or "will desire."

Passive (of fitness): *chilgàk-asok* "who is to be desired," "desirable."

Perfect Participial: *chilgetk-üng* "which has desired" or "has been desired" or "is desired."

### IMPERATIVE.

*chàlg* "desire (thou)"; *chàlg-it* "desire (ye)."

### INDICATIVE MOOD.

#### PRESENT FUTURE.

##### Singular.

1. *chàlg-AM* ..... I desire
2. *chàlg-I* (or *chalg*) thou desirest
3. *chàlg-D* ..... he desires

##### Plural.

1. *chàlg-AN* ..... we desire
2. *chàlg-IT* ..... ye desire
3. *chàlg-AN* ..... they desire

#### PAST.

1. *chàld-AM* ..... I desired
2. *chàld-AT* ..... thou desiredst
3. *chàld-ei* ..... he desired
1. *chàld-AN* ..... we desired
2. *chàld-AV* ..... ye desired
3. *chàld-AV* ..... they desired

#### IMPERFECT.

1. *chilgàkar-AM tu* I was desiring
2. *chilgàkar-AT-tu* thou wast desiring
3. *chilgàkar-tu* ... he was desiring
1. *chilgàkar-AN tu* we were desiring
2. *chilgàkar-AV tu* ye were desiring
3. *chilgàkar-AV tu* they were desiring



## PERFECT.

1. *chilgetk-AM*... I have desired
2. *chilgetk-AT* ... thou hast desired
3. *chilgetk* ..... he has desired
1. *chilgetk-AN* ... we have desired
2. *chilgetk-AV* ... ye have desired
3. *chilgetk-AV* ... they have desired

## PLUPERFECT.

1. *chilgettiw-AM* I had desired
2. *chilgettiw-AT*. thou hadst desired
3. *chilgettiw* ... he had desired
1. *chilgettiw-AN* we had desired
2. *chilgettiw-AV* ye had desired
3. *chilgettiw-AV* they had desired

*N.B.*—Although the above are the regular forms, yet the personal terminations of all Tenses referring to a *Past* time are separable from the verbal stem and may be placed in any previous part of the sentence, as has been said. This is the more common usage. When they are thus placed separately, the verb takes the form of the 3rd person singular of the tense required. Thus instead of saying "*wuz sa-tao-an chàld-AM*" ('I desired from thee') it is more usual to say "*wuz AM sa-tao-an chàldèi*" or "*wuz sa-tao-an AM chàldèi*." So "*tu khöch AT sa-maz-an chilgettiw*" or "*tu khöch sa-maz-an AT chilgettiw*" or "*tu AT khöch sa-maz-an chilgettiw*" instead of "*tu khöch sa-maz-an chilgettiw-AT*" ('thou hadst desired bread from me'). This cannot be considered an impersonal verb with an instrumental case as in Hindústání transitive past tenses, because we have here also a pronoun of the same person in the Nominative.

## THE CONDITIONAL MOOD.

## PRESENT.

*Singular.*

1. *chàlgam* ..... (if) I desire
2. *chàlg-ô* ..... (if) thou desirest
3. *chàl(g)d-ô* ..... (if) he desires

*Plural.*

1. *chàlgan-ô* ..... (if) we desire
2. *chàlgit-ô* ..... (if) ye desire
3. *chàlgan-ô* ..... (if) they desire

## PERFECT.

*Singular.*

1. *chilgetk-hümiām* ... (if) I had desired
2. *chilgetk-hümüi* ..... (if) thou hadst desired
3. *chilgetk-hümüt* ..... (if) he had desired

*Plural.*

1. *chilgetk-hümiün* ... (if) we had desired
2. *chilgetk-hümüit* ... (if) ye had desired
3. *chilgetk-hümiün* ... (if) they had desired



The Verbs which have their Infinitives in *g* or in *an* or *in* or their Perfects in *g* are conjugated in a precisely similar manner, regard being had to their typical forms (those of the Infinitive, Present, Past, and Perfect, which are given in the Vocabulary under each).

Ex. (i.) *Kshü-in* "to hear"; *kshüin-ar am tu* "I was hearing"; *kshü-in-küzg* "a hearer", &c.

(ii.) Pres. *kshüi-am* "I hear" *kshüi* "hear (thou)", &c.

(iii.) Past. *kshön-am* "I heard"; *kshön-i* "thou heardst" &c.

(iv.) Perf. *ksheng* "heard"; *ksheng am* "I have heard"; *kshengtiw am* "I had heard"; *ksheng hūmiam* "if I had heard"; *ksheng-ung* "who has heard" or "is heard."

So also (i) *wing* "to see"; *wing-ar am tu* "I was seeing" &c.

The *Negative* is formed by prefixing *ma* to the Imperative (or to other tenses when used in an Optative sense), and *na* to all other tenses.

The Interrogative is formed by affixing *á* to the verb. See Sariḳolí.

The NUMERALS are as follows :

|                               |       |                              |            |
|-------------------------------|-------|------------------------------|------------|
| <i>iv</i> or <i>í</i> .....   | one   | <i>dhas iv</i> .....         | eleven     |
| <i>búi</i> or <i>bù</i> ..... | two   | <i>wíst</i> .....            | twenty     |
| <i>trúi</i> .....             | three | <i>sí</i> .....              | thirty     |
| <i>tsabür</i> .....           | four  | <i>chil</i> .....            | forty      |
| <i>pánz</i> .....             | five  | <i>panjá</i> .....           | fifty      |
| <i>shádh</i> .....            | six   | <i>altmish</i> (Turkí) ..... | sixty      |
| <i>hüb</i> .....              | seven | &c.                          |            |
| <i>hát</i> .....              | eight | <i>sad</i> .....             | a hundred  |
| <i>nau</i> .....              | nine  | <i>hazür</i> .....           | a thousand |
| <i>dhas</i> .....             | ten   |                              |            |

a half = *chót* or *chóti*

One and a half = *iv u chót*

#### NUMERAL ADJECTIVES.

Add the syllable *ao* to the ordinary numerals: e. g. *iv-ao* = first, *búi-ao* = second, &c.



### Sketch of Sarikoli' Grammar.

#### THE SUBSTANTIVE.

There is no distinction of GENDER.

The PLURAL is formed by affixing the syllable *av* or *iv* in the oblique cases, and the Persian word خیل *khèl* (a troop) for the nominative.

The relations of substantives are expressed as in English, either by position or by means of Prepositions or Post-positions attached to the Singular or Plural form of the noun.

The Nominative is marked out by position. The possessive relation is expressed by simple apposition; the name of the thing possessed being placed last: e. g. *chèd divîr* = the door of the house (house-door).

The Singular has but one form; the Plural has two, that of the Nominative and the Oblique form.

#### SINGULAR.

|                                              |                                               |
|----------------------------------------------|-----------------------------------------------|
| the house (Nom.)                             | ..... <i>chèd</i>                             |
| the house's (Gen.)                           | ..... <i>chèd</i>                             |
| to the house (Dat.)                          | ... { <i>AR-chèd</i><br>or<br><i>chèd-IR</i>  |
| the house (Acc.)                             | ..... { <i>A-chèd</i><br>or<br><i>AR-chèd</i> |
| in or at the house (Loc.)                    | <i>PA-chèd</i>                                |
| on the house                                 | ..... <i>chü-chèd</i>                         |
| towards the house                            | ..... <i>PAR-chèd</i>                         |
| from the house (Abl.)                        | ... <i>AZ-chèd</i>                            |
| with the house                               | ..... <i>chèd-KATTI</i>                       |
| before the house                             | ..... <i>chèd-prüt</i>                        |
| as far as, till, also by means of, the house | ..... <i>chèd-ITS</i>                         |

#### PLURAL.

|                             |                                               |
|-----------------------------|-----------------------------------------------|
| NOM. the houses             | ..... { <i>chèd</i><br>or<br><i>chèd-khèl</i> |
| OBL. the houses' (Gen.)     | ... <i>chèdiv</i>                             |
| .....to the houses (Dat.)   | <i>chèdiv-IR</i>                              |
| .....the houses (Acc.)      | ... { <i>chèdiv</i><br>or<br><i>A-chèdiv</i>  |
| .....in the houses (Loc.)   | <i>PA-chèdiv</i>                              |
| .....on the houses          | ..... <i>chü-chèdiv</i>                       |
| .....towards the houses     | <i>PAR-chèdiv</i>                             |
| .....from the houses (Abl.) | <i>AZ-chèdiv</i>                              |
| .....with the houses        | ... <i>chèdiv-KATTI</i>                       |
| .....before the houses      | ... <i>chèdiv-prüt</i>                        |
| ..... as far as the houses  | <i>chèdiv-ITS</i>                             |
|                             | &c. &c.                                       |

There is also a kind of Genitive absolute in *an* or *yan*:

Ex. *pâdkhâh-AN î radzîn* = a daughter of the King's; *î vrod mu-yan* = a brother of mine.

#### THE ADJECTIVE

is not declined; it usually precedes the substantive.

An adjective can be formed from a substantive (or other word) by the addition of *enj* or *unj* (after a consonant), or *yenj* (after a vowel), which answers to the Hindústání "*wálá*."

Ex. *Garma-YENJ* "belonging to a cave."

*Dhes math-UNJ karâr* "an agreement for ten days."



Added to the Perf. Participle of a Verb, this affix makes a Participial Adjective which may take the place of a relative clause in English.

Ex. *mu wanj-inj chéd* "the house *which* I have seen."

With a substantive it has a similar effect :

Ex. *Chéd-enj àdam-khel* "the people *who are* in the house" or "of the house."

There is an Adjectival Future Participle in *ichoz*.

Ex. *pigan yet-ichoz àdam* "the man *who is going to arrive to-morrow*" (lit. "to-morrow about-to-arrive man").

#### PRONOUNS.

The pronouns have mostly two forms, a Nominative and an Oblique form, as in English. The prepositions and postpositions are applied to the latter, as to Substantives, so that it is unnecessary to go through them in detail here.

#### SINGULAR.

#### PLURAL.

##### 1ST PERSON.

|      |                  |    |                                     |    |
|------|------------------|----|-------------------------------------|----|
| Nom. | <i>waz</i> ..... | I  | <i>mash</i> .....                   | we |
| Obl. | <i>mu</i> .....  | me | <i>mash</i> or <i>mash-ev</i> ..... | us |

##### 2ND PERSON.

|      |                  |      |                                       |     |
|------|------------------|------|---------------------------------------|-----|
| Nom. | <i>tao</i> ..... | thou | <i>tamàsh</i> .....                   | ye  |
| Obl. | <i>tü</i> .....  | thee | <i>tamàsh</i> or <i>tamàsh-ev</i> ... | you |

##### 3RD PERSON.

|      |                 |                |                   |      |
|------|-----------------|----------------|-------------------|------|
| Nom. | <i>yü</i> ..... | he, she or it  | <i>wodh</i> ..... | they |
| Obl. | <i>wi</i> ..... | him, her or it | <i>wief</i> ..... | them |

#### ADJECTIVAL PRONOUNS.

|      |                 |      |                              |       |
|------|-----------------|------|------------------------------|-------|
| Nom. | <i>yu</i> ..... | that | <i>wodh</i> .....            | those |
| Obl. | <i>wi</i> ..... | that | <i>wi</i> —— <i>ef</i> ..... | those |

|      |                              |      |                                  |       |
|------|------------------------------|------|----------------------------------|-------|
| Nom. | <i>yam</i> .....             | this | <i>modh</i> or <i>dodh</i> ..... | these |
| Obl. | <i>mi</i> or <i>di</i> ..... | this | <i>mef</i> or <i>def</i> .....   | these |

There is, as in Wakhi, a set of personal terminations to the Past Tenses of verbs, which are capable of being separated from the verb to which they belong and put in other parts of the sentence. Thus they have a certain claim to be mentioned among the pronouns. Perhaps we may look upon them as having been originally affixed pronouns (after the manner of the agglutinative languages), which have become worn down to a certain extent, losing vowels, and even disappearing and (in the case of the 2nd pers. Pl.) giving place to a substitute ; but still retaining the recollection of their origin sufficiently to be used separately. They are :



| SINGULAR. |                                                     | PLURAL.                                                                                                                |
|-----------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 1st pers. | <i>am</i> (corresponding to Turki <i>man.</i> )     | <i>an</i> (corresponding to Turki <i>miz.</i> )                                                                        |
| 2nd       | „ <i>at</i> (..... <i>san.</i> )                    | <i>av</i> (the original pronoun lost, and its place supplied by the simple Plural affix of Nouns.)                     |
| 3rd       | „ — (also wanting in Turki, as a verb termination.) | <i>av</i> (do. Conf. Turki <i>lar</i> in 3rd pers. Pl. of verbs, which is simply a plural affix, used also with Noun.) |

#### THE VERB.

Each verb assumes, in its several parts, either three or four distinct forms from which the various tenses are formed by certain rules.

The following forms are generally distinct, *viz.*

(i.) The *Infinitive* or *Root* form, from which are derived a verbal Substantive and Adjective, an Imperative, and the Imperfect Indicative.

(ii.) The *Present* form, from which are derived the Present Tense Indicative, and the Present Conditional.

(iii.) The *Past* form, from which are derived the *Past* Tense and the Perfect Tense [unless when the latter has a separate form of its own (iv.)].

The *Root* may be considered a verbal Substantive of which the Nominative Case and Accusative are formed by the addition of the syllable *ao*, the Root itself being its oblique form to which can be affixed several postpositions. Thus:

#### *Root. Affix.*

- a. Nominative and Accusative: *zokht-ao* "to take" or "the taking."  
Oblique: *zokht-ir* "to the taking" or "in order to take."  
*zokht-its* "whilst taking" "during the taking."
- b. From the Root is also formed a Future Participle or Adjective by the addition of the affix *ichoz*:  
Ex. *zokht-ichoz* "about to take."
- c. And an adjective of probability in *asuk*:  
Ex. *zokht-asuk* "likely to be taken" or "to take."
- d. From the Dative of the Root is derived the Imperfect Tense Indicative Mood, as: *zokht-ir am vūd* "I was doing" [see Max Müller, *Sc. of Lang.*, Series II. p. 19.]



- (ii) *a.* The *Present* form is the basis of the Present Future Tense (with frequent irregularities in the 3rd Person Singular however). The terminations of this Tense are: 1st Person Singular *am*, 2nd Person Singular (none), 3rd Person Singular *d* or *t*; 1st Person Plural *an*, 2nd Person Plural *id* or *it*, 3rd Person Plural *in*.

[These terminations resemble, still closer than in Wakhi, (owing to the difference between the 1st and 3rd person of the Plural) those of the Present Future Tense of the Shina dialect of the Dardu Language. E. g., I go or will go, &c., in Shina, is Singular 1. *bóy-UM*, 2. *bóye*, 3. *bóye*; Plural 1. *bóy-ON*, 2. *bóy-ET*, 3. *bóy-EN*. See Leitner's Dardistan, Vol. I., p. 32.]\*

- b.* The Present Indicative gives rise to the Present Conditional by adding an *ó* to all the persons.

Ex. *zoz-amó* "if I should take" or "if I were to take."

- (iii) *a.* The *Past* form is the basis of the Past Tense, which is conjugated with the separable pronominal terminations given above at the end of the section on "Pronouns."

- b.* From it is formed (in many verbs) the Perfect Participle, by affixing the letter *j*.

Ex. Past Form: *zukht*; Perfect Participle: *zukhtj* "taken."

- (iv.) From the *Perfect* Participle (whether formed in this way or possessing an independent form) are derived:

- a.* A verbal Adjective, by the affixing of *enj* or *yenj*:

Ex. *zukhtj-enj* "having taken" or "which has taken."

- b.* The Perfect Tense, by the use of the separable pronominal terminations mentioned above:

Ex. *zukhtj-am* "I have taken."

- c.* The Perfect Conditional, by adding the several Persons of the Auxiliary Present Conditional *vao-am*, &c., "I may be, &c."

Ex. *zukhtj vao-am*, "I may have taken." (lit. "I may be having-taken.")

- d.* From the Perfect Tense Indicative Mood, again, is formed the Pluperfect Indicative, by affixing the syllable *it*, and using the separable terminations as before:

Ex. *zukhtj-it am* "I had taken."

\* The German Present Indicative has also a curious resemblance to these:

|                     |              |                      |            |
|---------------------|--------------|----------------------|------------|
| Ich mache . . . . . | I make.      | Wir machen . . . . . | we make.   |
| Du machst . . . . . | thou makest. | Ihr macht . . . . .  | ye make.   |
| Er macht . . . . .  | he makes.    | Sie machen . . . . . | they make. |



## CONJUGATION OF THE VERB "TO TAKE."

(3 Forms.)

- (i) Root form: *zokht*; (ii) Present form: *zôz*; (iii) Past form: *zukht*.

Verbal Substantive: Nominative and Accusative Case: *zokht-ao* "the taking" or "to take."

Genitive Case,... *zokht* "of the taking."

Dative Case, ... *zokht-ir* "to take" or "in order to take" or "to the taking."

Abl.,..... *az zokht* "from the taking."

&c., ..... *zokht-its* "during the taking" or "whilst taking."

Perfect derivative Adjective: *zokhtj-enj* "having taken" or "taking."

Future ditto ditto ..... } *zokht-ichoz* "about to take" or "the  
Also Noun of the Agent ... } taker."

Verbal Adjective of probability *zokht-asuk* "likely to be taken" or "to take."

### IMPERATIVE.

*zôz* = take thou.

*zôz-id* = take ye.

### INDICATIVE MOOD.

#### PRESENT FUTURE TENSE.

##### *Singular.*

1. *zôz-am*..... I take or will take.
2. *zôz* ..... thou takest, &c.
3. *zôz-d* ..... he takes, &c.

##### *Plural.*

1. *zôz-an* ..... we take, &c.
2. *zôz-id* ..... ye take, &c.
3. *zoz-in* ..... they take, &c.

#### IMPERFECT TENSE.

##### *Singular.*

1. *ZOKHTIR (am)\* vüd* I was taking.
2. *ZOKHTIR (at) vüd* thou wast taking.
3. *ZOKHTIR vüd*..... he was taking.

\* The syllables between brackets are the separable pronoun-terminations.



*Plural.*

1. ZOKHTIR (*an*) *vūd* we were taking.
2. ZOKHTIR (*av*) *vūd* ye were taking.
3. ZOKHTIR (*av*) *vūd* they were taking.

## PAST TENSE.

*Singular.*

1. ZUKHT (*am*) ..... I took.
2. ZUKHT (*at*) ..... thou tookest.
3. ZUKHT .....\* he took.

*Plural.*

1. ZUKHT (*an*) ..... we took.
2. ZUKHT (*av*) ..... ye took.
3. ZUKHT (*av*) ..... they took.

## PERFECT TENSE.

*Singular.*

1. ZUKHTJ (*am*) ..... I have taken.
2. ZUKHTJ (*at*) ..... thou hast taken.
3. ZUKHTJ ..... he has taken.

*Plural.*

1. ZUKHTJ (*an*) ..... we have taken.
2. ZUKHTJ (*av*) ..... ye have taken.
3. ZUKHTJ (*av*) ..... they have taken.

## PLUPERFECT TENSE.

*Singular.*

1. ZUKHTJ-*it* (*am*) ..... I had taken.
2. ZUKHTJ-*it* (*at*) ..... thou hadst taken.
3. ZUKHTJ-*it* ..... he had taken.

*Plural.\**

1. ZUKHTJ-*it* (*an*) ..... we had taken.
2. ZUKHTJ-*it* (*av*) ..... ye had taken.
3. ZUKHTJ-*it* (*av*) ..... they had taken.

## CONDITIONAL AND SUBJUNCTIVE MOOD.

## PRESENT FUTURE TENSE.

1. ZOZ-*amō* ..... I may *or* should take.
2. ZOZ-*ō* ..... thou mayest *or* shouldst take.
- &c. ....&c.

## PERFECT TENSE.

1. ZUKHTJ *vao-am* ..... I may have taken.
2. ZUKHTJ *vao* ..... thou mayest have taken.
3. ZUKHTJ *vid* ..... he may have taken.
- &c.\* .....&c.

\* See Auxiliary defective verb "to be."



The prefix *tsa* is often used with the Indicative Present tense to give it a Subjunctive or Conditional sense.

In some Verbs the 3rd Person Singular of the Present Indicative is irregular in its form :

#### EXAMPLES.

| <i>Singular.</i>       |                | <i>Singular.</i>        |                |
|------------------------|----------------|-------------------------|----------------|
| 1. <i>vor-am</i> ..... | I bring.       | 1. <i>didh-am</i> ..... | I enter.       |
| 2. <i>vor</i> .....    | thou bringest. | 2. <i>didh</i> .....    | thou enterest. |
| 3. <i>VIR-d</i> .....  | he brings.     | 3. <i>DEDH-d</i> .....  | he enters.     |
| <i>Plural.</i>         |                | <i>Plural.</i>          |                |
| 1. <i>vor-an</i> ..... | we bring.      | 1. <i>didh-an</i> ..... | we enter.      |
| 2. <i>vor-id</i> ..... | ye bring.      | 2. <i>didh-id</i> ..... | ye enter.      |
| 3. <i>vor-in</i> ..... | they bring.    | 3. <i>didh-in</i> ..... | they enter.    |

| <i>Singular.</i>       |               | <i>Singular.</i>       |              |
|------------------------|---------------|------------------------|--------------|
| 1. <i>zân-am</i> ..... | I kill.       | 1. <i>kan-am</i> ..... | I make.      |
| 2. <i>zân</i> .....    | thou killest. | 2. <i>kan</i> .....    | thou makest. |
| 3. <i>ZIN-d</i> .....  | he kills.     | 3. <i>KAKH-t</i> ..... | he makes.    |
| <i>Plural.</i>         |               | <i>Plural.</i>         |              |
| 1. <i>zân-an</i> ..... | we kill.      | 1. <i>kan-an</i> ..... | we make.     |
| 2. <i>zân-id</i> ..... | ye kill.      | 2. <i>KA-ït</i> .....  | ye make.     |
| 3. <i>zân-in</i> ..... | they kill.    | 3. <i>KA-ïn</i> .....  | they make.   |

In the last example it will be observed that the 2nd and 3rd persons Plural are also irregularly formed.

Some Verbs have a distinct Perfect form [not derived according to rule from the Past Form].

#### CONJUGATION OF THE VERB "TO GO" OR "TO BECOME."

[4 Forms.]

- (i) Root Form : *set* ; (ii) Present Form : *so* ; (iii) Past Form : *süt* ;  
(iv) Perf. Form : *sedhj* (not *sütj*).

Verbal Substantive ; Nominative and Accusative Case [Infinitive] : *set-ao* "the going *or* becoming," "to go *or* become."

Genitive Case, *set* "of the going *or* becoming."

Dative Case : *set-ar* "to the going *or* becoming," "in order to go *or* become."

Abl. Case : *az set* "from going, &c."

&c.... *set-its* "during the going" or "whilst going."

Perfect Adjective derivative ..... *sedhj-enj* "having gone *or* become."

Future ditto ..... *set-ichoz* "about to go *or* become."

Adjective of probability ..... *set-asuk* "likely to go, &c."



# INDICATIVE MOOD.

## PRESENT FUTURE TENSE.

### *Singular.*

1. *sò-'m*..... I go *or* become, *or*  
will go *or* become.
2. *sò* ..... thou goest, &c.
3. *sau-d*..... he goes, &c.

### *Plural.*

1. *sò-'n or sò-yan* we go, &c.
2. *sò-id* ..... ye go, &c.
3. *sò-in* ..... they go, &c.

## IMPERFECT TENSE.

### *Singular.*

1. *setar [am] vūd*.. I was going *or*  
becoming.
2. *setar [at] vūd*... thou wert going  
&c.
3. *setar vūd*..... he was going, &c.

### *Plural.*

1. *setar [an] vūd* we were going, &c.
2. *setar [av] vūd* ye were going, &c.
3. *setar [av] vūd* they were going,  
&c.

## PAST TENSE.

### *Singular.*

1. *sūt [am]* ..... I went *or* became.
2. *sūt [at]* ..... thou wentest, &c.
3. *sūt* ..... he went, &c.

### *Plural.*

1. *sūt [an]*..... we went, &c.
2. *sūt [av]*..... ye went, &c.
3. *sūt [av]*..... they went, &c.

## PERFECT TENSE.

### *Singular.*

1. *sedhj [am]* ... I have gone *or*  
become.
2. *sedhj [at]* ..... thou hast gone, &c.
3. *sedhj* ..... he has gone, &c.

### *Plural.*

1. *sedhj [an]*..... we have gone, &c.
2. *sedhj [av]* ..... ye have gone, &c.
3. *sedhj [av]* ..... they have gone, &c.

## PLUPERFECT TENSE.

### *Singular.*

1. *sedhj-it [am]*... I had gone *or* be-  
come.
2. *sedhj-it [at]* ... thou hadst gone,  
&c.
3. *sedhj-it* ..... he had gone, &c.

### *Plural.*

1. *sedhj-it [an]* ... we had gone, &c.
2. *sedhj-it [av]* ... ye had gone, &c.
3. *sedhj-it [av]* ... they had gone.

# CONDITIONAL AND SUBJUNCTIVE MOOD.

## PRESENT FUTURE TENSE.

### *Singular.*

1. *sò-'mō* ..... I may *or* should go  
*or* become.

## PERFECT TENSE.

### *Singular.*

1. *sedhj vao-am*... I may have gone  
*or* become.



2. *sò-yô* ..... thou mayest or shouldst go, &c.      2. *sedhj vao* ..... thou mayest have gone, &c.

3. *sau-dô* ..... he may, &c.      3. *sedhj vid* ..... he may have gone, &c.

*Plural.*

1. *sò-'nò* ..... we may, &c.

2. *sò-idò* ..... ye may, &c.

3. *sò-inò* ..... they may, &c.

*Plural.*

1. *sedhj vao-an* ... we may have gone, &c.

2. *sedhj vao-id* ... ye may have gone, &c.

3. *sedhj vao-in* ... they may have gone, &c.

### CONJUGATION OF THE DEFECTIVE VERB "TO BE."

(i) Root Form : *vid* ; (ii) Pres. Form : *vao* ; (iii) Past Form : *vüd* ;  
(iv) Perf. Form : *vedhj*.

Nom. *vid-ao*.

Obl. *vid*, (*vid-ir*, *vid-its*, &c.)

Perfect Participial Adjective ..... *vedhj-enj*.

Future do. (also Noun of the Agent) ... *vid-ichoz*.

Verbal Substantive, "the being or existing" : *vid-i*.

### INDICATIVE MOOD.

#### PRESENT FUTURE TENSE.

*Singular.*

1. *vao-am*\* (*yost-am*)† ..... I may be, or am.
2. *vao* (*yost-at*) ..... thou mayest be, or art.
3. *vî-d* (*yost*) ..... he may be, or is.

*Plural.*

1. *vao-an* [*yost-an*] ..... we may be, or are.
2. *vao-id* [*yost-av*] ..... ye may be, or are.
3. *vao-in* [*yost-av*] ..... they may be, or are.

#### PAST TENSE.

*Singular.*

1. *vüd* [*am*] ..... I was.
2. *vüd* [*at*] ..... thou wert.
3. *vüd* ..... he was.

#### PERFECT TENSE.

*Singular.*

1. *vedhj* [*am*] ... I have been.
2. *vedhj* [*at*] ... thou hast been.
3. *vedhj* ..... he has been.

\* Generally has a conditional sense, but is placed here, because it is in form a Present Indicative.

† This alternative tense is in form the Past-tense of some other Verb, but used for the Present Tense of this.



*Plural.*

1. *vüd* [*an*] ..... we were.
2. *vüd* [*av*] ..... ye were.
3. *vüd* [*av*] ..... they were.

*Plural.*

1. *vedhj* [*an*] ... we have been.
2. *vedhj* [*av*] ... ye have been.
3. *vedhj* [*av*] ... they have been.

## PLUPERFECT TENSE.

*Singular.*

1. *vedhj-it* [*am*] I had been.
2. *vedhj-it* [*at*].. thou hadst been.
3. *vedhj-it* ..... he had been.

*Plural.*

1. *vedhj-it* [*an*].. we had been.
2. *vedhj-it* [*av*].. ye had been.
3. *vedhj-it* [*av*].. they had been.

## CONDITIONAL AND SUBJUNCTIVE MOOD.

## PRESENT FUTURE TENSE.

*Singular.*

1. *vao-amò*..... I may or should be.
- &c. &c.

## PERFECT TENSE.

*Plural.*

1. *vedhj-vao-am*... I may have been.
- &c. &c.

## THE INTERROGATIVE

is formed by affixing *â* to the verb, when there is no other interrogative adverb or pronoun in the sentence.

E. g. *tü kâhr-yât-â* = has thy anger come ?

but : TSEZ-AR *at yât* why hast thou come ?

## NEGATIVE.

The ordinary negative consists of the syllable *na* prefixed to the verb. But in the Imperative or Optative the syllable *ma* is used instead.

E. g. *na kan-am*, I make not.

*ma kan*, make not [thou].

## NUMERALS.

The Numerals are as follows :—

|                                 |        |
|---------------------------------|--------|
| <i>iv</i> or <i>î</i> .....     | one.   |
| <i>dhâu</i> or <i>dhâ</i> ..... | two.   |
| <i>harò</i> .....               | three. |
| <i>tsavur</i> .....             | four.  |
| <i>pinz</i> .....               | five.  |
| <i>khel</i> .....               | six.   |
| <i>üvd</i> .....                | seven. |
| <i>wokht</i> .....              | eight. |
| <i>néaw</i> .....               | nine.  |
| <i>dhés</i> .....               | ten.   |

|                            |             |
|----------------------------|-------------|
| <i>dhés-at-î</i> .....     | eleven.     |
| <i>vist</i> .....          | twenty.     |
| <i>vist-at-î</i> .....     | twenty-one. |
| <i>sî</i> .....            | thirty.     |
| <i>châl</i> .....          | forty.      |
| <i>pinju</i> .....         | fifty.      |
| <i>altmish</i> [Turkî] ... | sixty.      |
| &c. *                      | &c.         |
| <i>sad</i> .....           | a hundred.  |
| <i>hazôr</i> .....         | a thousand. |

A half = *naim* ; a quarter = *tsavur balâk*.

One and a half = *iv-at-naim*, &c.

## NUMERAL ADJECTIVES

Add the syllable *ào* to the ordinary Numerals.

E. g. *iv-ào* first, *dhâu-ào* second, &c.

\* The remaining multiples of ten up to ninety are borrowed from the Turkî.



## SUNDRY REMARKS.

1. The prefixes or prepositions, *a* and *ar* (*ir*), are never separated from their noun by any adjective or other word. Thus we have :

*tu ar-tsem*, lit. "thy to eyes", not *ar-tu-tsem* "to thine eyes."

Generally the other prepositions also immediately precede the noun :

E. g. *Khū tar-tsem* "to his own eye" (lit. "own to-eye")

*chinār pa-bōn* "at bottom of plane-tree" (lit. "plane-tree's at bottom")

*i pa-garmā* "in a cave" (lit. "one in-cave")

but we also have :

*pa mi kásh* "at this side" (lit.)

It would seem that adjectives and adjectival pronouns are sometimes allowed to be interposed between the prepositions (other than *a* and *ar*) and the noun.

2. There seems to be a Dative absolute in *i* :

Ex. *sandik mu'r-i* (*mu-ar-i*) " (let the) box (be) for me *or* to me"

*khurjin tü'r-i* (*tü-ar-i*) " (let the) bag (be) for thee *or* to thee"

or, as we should say, "the box to me, the bag to thee."

With a verb, the Dative would be : *a-sandik mu'r dhā*

"give the box to me."

3. The separable verb-terminations or pronouns in both Wakhí and Sariḳolí, are sometimes used instead of the verb substantive, after the manner of the Turkí language (which, however, employs the ordinary pronouns reduplicated).

Ex. (Sariḳolí) *laur AM waz* "I (am) great."

instead of *waz laur yostam* do.

Compare (Turkí) *man ulugh man* do.

(Sariḳolí) *dzül AT táo* "thou (art) small"

instead of *táo dzül yostat* do.

Compare (Turkí) *san kichik san* do.

The example of the Turkí (although belonging to another family of languages) shows, I think, that we need not seek, in these separable terminations, for the relics of some defunct verb substantive. In the present examples, as in children's language, the verb substantive is simply omitted altogether; the apposition of the subject to the attribute being sufficiently explicit. A child says: "I good," "dog naughty." The Turk and the Ghalchah, in their own several manners, do the same; only, for emphasis, they contrive to insert the pronoun twice (as in French "*je suis bon, moi*").



But it may be said: why should not these separable terminations be considered a tense of the verb substantive; attached to other verbs as an auxiliary, and also used independently as connecting the subject with its attribute? But I think the following answer might be made. Any tense of the verb substantive must have consisted originally of two elements; the constant *verb* element, and the variable *personal* or *pronominal* element. In the present case, the former element (if it ever existed) must have been rubbed off, for nothing remains but single syllables varying with the persons; in other words we have come back to the simple pronominal element, corrupted it may be by the companion which it has now shaken off. In either case, the separable terminations which we are considering are Pronouns, whether they have gone through the process of being attached to an auxiliary verb substantive (now vanished), or not.\*

3. Relative clauses, which are rare in the simple Ghalchah dialects, are expressed usually by means of the verbal adjectives in *ung* (W.) and *enj* (S.), and in *küzg* (W.) and *ichoz* (S.)

Ex.

|          |                                  |   |                                                                            |
|----------|----------------------------------|---|----------------------------------------------------------------------------|
| Wakhí    | <i>Chini schköt-ung khalg</i>    | } | “the person who breaks or<br>has broken, the cup.”                         |
| Sariqolí | <i>a-chin varakhtj-enj adam</i>  |   |                                                                            |
| Wakhí    | <i>Chini schködhn-kuzg khalg</i> | } | “the person who will break<br>or is in the habit of breaking,<br>the cup.” |
| Sariqolí | <i>a-chin varakht-ichoz adam</i> |   |                                                                            |

In this they resemble the Turanian languages.

4. Causatives or Transitives are generally formed in *iv* or *üv* (Wakhí), and *ánd* and *ân* (Sariqolí).

Ex. Wakhí: *nadhefs-an* = to be dented  
*nadhefsüv-an* = to dent.

Sariqolí: *bizeid-ao* = to touch  
*bizeidánd-ao* = to cause to touch.  
*bizís-am* = I touch  
*bizísân-am* = I cause to touch.

5. In compounds formed of two verbs, both of them generally vary together, taking the terminations of the same person, instead of one of them taking a Participial form, as in Persian, Urdú, &c.

Ex. *rasidham-dürzam* = I cut I take  
(I cut out)

instead of

*dözg-rasidham* = having taken I cut  
or

*rasang-dürzam* = having cut I take.

\* Compare the Persian terminations of the Perfect tense (*am*, *i*, &c.), which are also used to replace the verb substantive (See Forbes' Persian Gram. § 18). They



TALES FROM FORBES'S PERSIAN GRAMMAR PUT INTO  
WAKHI.

1. I' khalg sa Aflatún-an pörstei ki ghafeh sâl da kishti  
one person from Plato (abl.) asked that many years in ship  
tu daryâ safar at gokhteî da daryâ chiz 'ajaib at  
wert sea voyage (thou)\* madest in sea what wonder (thou)  
windeî. Khatteî 'ajab hêm (ha-yem) tu ki sa daryâ-an  
sawest? He said wonder this was that from sea (abl.)  
yikah-in saht am gotteî.  
(to) shore (abl.) safe (I) arrived.

2. I' diwâna da i' bâi darwâza ragdeî i' chiz  
a beggar to a rich man's door went one thing  
châldeî. Sa khûn dôst-an jawab wazdeî ki kônd da khûn nast  
asked for. From house inside (abl.) answer came that woman in house is not.  
Diwâna khatteî: chôt khôch am chilgattiw, kônd am na-chilgattiw  
Beggar said: piece bread (I) had asked for, woman (I) had not asked for  
ki azi jawâb am gotteî.  
that such answer (I) have got.

3. I' hakim har waqt da kabristân rachanar-tu khû réimal da khû  
a doctor whenever to graveyard used to go his scarf to his  
sar da khû rûi zwaînar-tu; khalgisht pörstei ki: yáo sabab chiz kô?  
head to his face used to wrap; people (pl.) asked that: its reason what?  
khatteî: yem kabristân khalgiv-an khajal wâtsam yao jinib ki sa zû  
he said: this graveyard people from ashamed I am because that from  
dâru-an mard ki.  
my medicine they have died.

4. I' rwar i' mîr khû pôtr mashan da shikâr ragdeî. Hawâ shûndr  
one day a king own son with to hunting went. Air hot  
witteî. Mîr da khû pôtr-an khû bôt-a da i' shtik-khâk-küzg tan  
became. King with his son his cloak to one jest-maker's back  
lákarteî. Mîr khandeî khatteî: Eh shtik-khâk-küzg da tao i' khur vûr  
put. King smiled said: Oh jester to thee one donkey's load  
ap-kûmût. Khatteî: Balki bù' khur vûr.  
there is. He said: Yea two donkeys' load.

5. I' put-dâm-ar khatteî: chalgi ki ti 'dâm rást  
one crook-back to (they) said: desirest thou that thy back straight  
wâst ya digar khalgav dâm ti dâm rang put-dâm  
should become or other people's back thy back like crook-backed  
wâst? Khatteî: chálgam ki digar khalgav dâm put-dâm wâst  
should become? He said: I desire that other people's back crooked should become

seem to be mere contractions of the fuller form *astam*, *astî*, &c., which is also sometimes used as a termination (or auxiliary verb) to the Perfect Tense (See Forbes, § 48. c). But as the whole of the constant element (*ast*) of this latter form has disappeared in the contracted form *am*, *i*, &c., it is evident that nothing can be left in the form *am*, *i*, &c., but relics of the pronouns.

\* The English of the separable pronouns is put in brackets.





latsar,\* yáo jinib ki da-yà chazm-an yáisht a-máz vînan waz yáv  
 because that with those eyes they (acc.) me see I them  
 sa vînam.  
 may see.

6. I rwâr î mîr sa sha'ir-an rîzdei, jallád  
 one day a king from (with) poet (abl.) become angry, executioner  
 ramattei ki da zû prût shái. Jallád khangâr wüzüman-ar  
 ordered that in my presence kill (him). Executioner sword to fetch  
 tagdei. Sha'ir házir khangav-ar khattei: ta khangâr wüzüman-its  
 went. Poet present people to said: till sword fetching whilst  
 a-máz chipát diid ki mîr khush wâst latsar. Mîr kandeî, yáo  
 me slap strike (ye) that king happy may-become. King smiled his  
 gunáh shökhhteî.  
 fault passed over.

7. I khalg lup martaba gottei. I dost mubârak gokhn-  
 a person great dignity obtained. A friend congratulation in order-to  
 ar wazdei. Yá khalg pörstei: tu kûi, chiz-ar at wazdei? Yáo  
 do came. That person asked: thou who what for (thou) hast come? His  
 dost sharminda vittei. Khattei: A-máz na dish'-á? ti qadimi dost  
 friend ashamed became. He said: me not knowest? thy old friend  
 wuz; niûwn-ar da ti prût am wazdei; kshôn-am ki kur  
 I; in order to weep into thy presence (I) came I heard that blind  
 at vitkei.†  
 (thou) hast become.

8. I khalg darwêsh dastâr dözdei rannei darwêsh da-ḡabristân ragdei  
 a person beggar's turban took fled beggar at grave-yard went  
 neinei. Khalgisht yâr khattei: ki yá dhai ti dastâr da bâgh-  
 sat. People to him said: that that man thy turban in garden  
 gana yûttei, da ḡabristân chiz-ar at nieng chiz  
 direction took away in grave-yard what for (thou) hast sat down what  
 gokh. Khattei: Yáo ba ákhir ha-dram ap vizit.  
 dost (thou). He said: He at the end to this very (place) will come.  
 Ha-yem jinib dram nieng-am.

Therefore here I have sat down.

9. I naḡsh-khák-küzg da i shahr ragdei drá tabîbi pursam  
 a picture-maker to a town went there doctoring beginning  
 gokhteî. Tsum rwâr-an sibás i khalg sam diâr-an dà  
 made. Some days (abl.) after a person from his country (abl.) at that

\* *Latsar* is the root or Imperative form of the verb *latsar-an* "to put." Combined with another verb it seems merely an intensitive, if not altogether superfluous. It will be observed that the Optative 3rd person is rendered by the simple Imperative.

† According to the form given in the grammar this ought to be merely *vitk* (see 3rd person singular of the Perfect Tense). But I let it stand as above as taken down by me. It may be a mistake, through a false analogy on the part of the illiterate man from whom I took down the phrase; or it may indicate that the rule is not a hard and fast one.



shahr ghattei. Yáo vindei pörstei: Haniv chiz yer<sup>k</sup> go? \* khattei: tabíbi town arrived. Him saw asked: Now what work doest? said: doctoring gom.\* Pörstei chiz-ar? Khattei, Yáo jinib ki agar dam yer<sup>k</sup> I do. He asked what for? He said, (for) that reason that if in this work gunáh gokham, shet yáo pür-döst dikht.

fault I make, earth it on inside (strikes) presses.

10. Mir Iskandar Zû-'l-karnain i rwâr sa i faķir-an  
King Alexander Lord-of-two horns one day from a beggar  
shökhkstei. Khattei: Eh faķir, sa máz-an i chiz chál<sup>g</sup>.  
passed by. He said: Oh beggar, from me (abl.) something ask.  
Khattei: Mags tashwish rándan, ramai ki ma-rándan. Mir  
He said: flies trouble give, command that (they) should not give. King  
khattei: sa máz-an i chiz chál<sup>g</sup> ki da zû hukm hümüt. Faķir  
said: from me (abl.) something ask - that in my power may be. Beggar  
khattei: agar mags da ti ikhtyár na hümüt, sa táo-an chiz  
said: if flies in thy power not may be from thee (abl.) what  
chálgam?

shall I ask?

11. I rwâr i khal<sup>g</sup> khat-ar khattei ki har chiz da wundr da  
one day a person self to said that whatever in earth in  
asmán hümüt, kökht sa zû jinib hümüt; a-máz Khudá ghafch  
heaven may be all from (for) my sake may be (is); me God very  
lup áfrída gokhteí. Yá waķt i mags dam mis neinei. Khattei:  
great created made. That time a fly on his nose alighted. It said:  
tár azi takáburi na sáz<sup>d</sup>. Yáo jinib ki  
to thee such superciliousness is-not-becoming. (For) that reason that  
har chiz da wundr da asmán hümüt, Khuda ti jinib áfrída gokhteí;  
whatever in earth in heaven may be, God (for) thy sake created made;  
balki a-táo sa zû jinib-an. Na dish' á ki sa táo-an  
but thee from (for) my sake (abl.) Perceivest-thou-not that than thee (abl.)  
luptar am wuz.  
greater (I) I.

12. I khál<sup>g</sup> i bái sif<sup>at</sup> gokhteí. Hech chiz na gottei.  
a person a merchant's praise made. nothing not received.  
Yáo sibás-an ghaibat gokhteí; bái yáor hech chiz na khattei.  
That after slander made; merchant to him any thing not said.  
Bû rwâr-an sibás yá khal<sup>g</sup> dam darwáza ragdei neinei. Bái  
Two days (abl.) after that person at his gate went sat. Merchant  
khattei: Eh khal<sup>g</sup>! sif<sup>at</sup> at gokhteí, wuz hech chiz am na  
said: Oh such-an-one! praise (thou) madest, I any thing (I) not  
rattei; ghaibat at gokhteí hech chiz am na khattei: haniv  
gave; slander (thou) madest any thing (I) not said: now  
dram chiz-ar at nieng? Khattei: Haniv chálgam  
in this (place) what for (thou) hast sat down? He said: Now I desire  
ki agar moriô ti baid khánam.  
that if thou mayest die thy lament I will sing.

\* Go and gom short for gokh and gokham.





## WAKHÍ TALE.\*

I kampír tu. Yáo-an i napüs tu. I rwâr yáo napüs khattei ki: Mir dhagd mar khistagà katt. Kampír khattei ki: Yáo Mir hümüt, sak faķir hümüün, yáo khü dhagd randà. Yáo napüs khattei ki: Tu rach, hudda pür maz. Kampír ragdei, khattei ki: I yupk-wâr chálgam. Mir khattei ki: Tamshín lüch díid. Chiz gí yit. Mir naukar-av tamshín lüch dikhteí. Pa khun ragdeí. Wáz yáo napüs stattei. Wáz Mir khun ragde. "I yupk-wâr chálgam," khattei. Mir khü Wazír-ar khattei ki: Yem shain-à, tsi-rang gôn? Wazír khattei ki "kalinga tķi katan. Yàn pūshít ap." "Khhub, kaling katít." Hazâr kalâ, hazâr shutur, hazâr chât, hazâr yambu, hazâr kimkhâb bôt, hazâr atlâs bôt, hazâr adrâs bôt, hazâr arghumâk yâsh, hazâr ghulâm, hazâr chori, karteí. Kampír khaffah vitteí ragdei.

Yao napüs pörsteí "Hà mûm, tsi-rang". Kampír khattei: Yem rang, yem rang, yem rang." Napüs khattei: "Ma'kul vinetk hümüt, hudda pür maz." Yao napüs angüshtar karteí khattei ki: "Atûm mâliba dram kökht paída wâst latsar." Ba dam-i-Suleimân Paighambar karteí; kökht paída vitteí. Mir prüt khalg ramatteí: "Anjâm am bâzír gokhteí. Mir khü anjâm gokht latsar." Mir hairân vitteí waragneí. Khü Wazír-an pörsteí ki: "Tsi rang gôn?" Wazír khattei ki, "Niv randan, hech Mir tsa khü wa'dah-an na pūshetk" Mir khattei: Anjâm wüzûmît" Khalg ragdei, kaling wozomdei. Mir hairân vitteí. Da Mir kila na wisteí. Toi-av gokhteí yutteí.

Kampír napüs da î chúl bíabán sa íshn-an kıla' karteí. Mir dhagd yutteí. I' rwâr tu, ki shikâr nieshteí, ki kampír wazdei. Pörsteí ki, Kampír! chiz-ar at wazdei. Kampír khattei ki, Da Mir dâmâd khun racham.

Mir dâmâd da khü sibas karteí wozomdei. Mir dhagd khattei, A-yem chizar at wozomdei, kampír khü pa-khûn ap na latsaran. Mir dâmâd khattei ki: Sam dhast-an chiz wízít. Mir dhagd khattei: Ti díl hümüt.

I' rwâr dâmâd shikâr nieshteí. Kampír khattei, Ti dhai târ yurung na tüwetk. Khü shâfsh dez ino (?) nözd, da khü dhai prüt ma-niüz. "Chizar na niüz" khand-ô, "Tu mâr yurung-a na-tüwetk; tu mar yurungô, angüshtar mâr rand," khan. Yao dhai wazdei, tam prüt na nieshteí. Khattei ki "chizar at zû prüt na-nieshteí." Dhagd khattei. "Tu mâr yurung na-tüwetk." Khattei "tsi-rang yurungam nist." Dhagd khattei ki: Tao mâr yurung hümüi angüshtar mâr rand. Yao dhai yaor rattei.

Wáz shikâr nieshteí, kampír khattei ki: Daryá lab rachan. Da-daryá lab ragdei. Kampír khattei: Zûi-an i charkh teí, sak ha-yao vidhâwan. Mir dhagd vidhettei kampír katti; räs tav-gokhteí, pa asmân nieshteí; chap tav-gokhteí da-i shahr washteí. Ya shahr Mir kampír-ar i lak tillah rattei. Kampír tillah dözdei tagdei.

\* This seems to be merely a badly remembered story of the common Oriental type. But it will serve as an illustration of the Wakhi mode of speech.



Yao napüs wazdei, ki yao<sup>\*</sup> könd nist. Ghafch khaffa vittei. I'maina yao-an tu. Sa maina-an pörstei: Tar-kum ragdei? Maina khattei ki: Da-kampir-an katti tagdei. Napüs khattei ki: Tsa-rang gön. Maina khattei ki: "Wuz shahr ba-shahr gir-am shkur-am; got-am-ô angüshtar màr rand-ap." Yao khattei: Khhub, rach, tu wàz amàz ma-bun. Maina khattei, Wuz na bun-am.

Maina ragdei, shkurdei; sum sàl shkurdei, gottei. Mir dhagd angüshtar maina-'r rattei. Maina yuttei kampir napüs-ar rattei. Yao ba-dam-i-Suleiman Paighambar kàrtei. Yao könd paida vittei, da khü muràd maḡ-sud gottei.

#### TRANSLATION OF THE FOREGOING WAKHÍ TALE.

There was an old woman. She had a grandson. One day her grandson said: "Ask the King's daughter (in marriage) for me, (lit. arrange a betrothal)." The old woman said: "He is a king, we are beggars; will he give his daughter (to you)?" The grandson said: "Go thou; the responsibility is on me." The old woman went (and) said: "I desire a drawer of water".\* The king said: "Kick (her out). What dirt is she eating?" The king's servant kicked (her out). She went home. Again her grandson sent (her), again she went to the king's house. "I desire a drawer of water", she said. The king said to his Wazir: "Shall we kill her, (or) what shall we do?" The Wazir said: "Let us appoint a large (full) marriage settlement. From that she will turn back (*i. e.* she will be unable to comply with it)." The king said: "Good, appoint a marriage settlement." He appointed a thousand rams, a thousand camels, a thousand cows, a thousand 'yambus,'† a thousand brocade garments, a thousand satin garments, a thousand silk garments, a thousand thorough-bred horses, a thousand slaves, a thousand female slaves. The old woman became angry, (and) went away.

Her grandson asked: "Well, grandmother, how (go matters)?" The old woman said: "Thus and thus." The grandson replied: "It is agreed. I am answerable." Her grandson drew on a ring and said: "Let so much goods be all produced on this spot." With the breath of the Prophet Solomon he drew it on. Every thing was produced. He sent people into the presence of the king (saying), "I have made ready my arrangements, let the king prepare his own." The king remained in astonishment. He asked his Wazir: "What shall we do?" The Wazir said: "We will now give (the princess). No king has turned back from his promise." The king said, "Take his preparations." The people went and brought the marriage gift (of the bridegroom). The king was astounded. It could not be

\* Wakhi mode of asking for a wife.

† A Chinese silver piece in the shape of a shoe, worth about £17 and current in Eastern Turkistán.



contained in the king's castle. They made the marriage and took away (the bride).

The old woman's grandson made a fortress of iron in a desert, (and) took the king's daughter (there). One day it so happened that he went out hunting. The old woman came. He asked, "Old woman! wherefore hast thou come?" The old woman said, "I am going to the house of the king's son-in-law."

The king's son-in-law put (her) behind him (on his horse) and brought her (home). The king's daughter said: "Why hast thou brought her? We will not put the old woman in our house." The king's son-in-law said: "From her hand what will come (what harm will she do)?" The king's daughter said: "It will be thy heart (?)"

One day the son-in-law went out to hunt. The old woman said: "Thy husband does not love thee, undo thy hair and sit weeping, do not go forth into thy husband's presence. If he says 'Why dost thou not come forth?' say, 'Thou dost not love me; if thou lovest me give me (thy) ring.'" Her husband came, she went not forth into his presence. He said: "Wherefore camest thou not into my presence?" The girl said: "Thou dost not love me." He said: "How do I not love (thee)?" The girl said: "If thou lovest me, give me (thy) ring." Her husband gave (it) to her.

Again he went out to hunt. The old woman said, "Let us go to the river bank." They went to the river bank. The old woman said: "I have a (spinning) wheel (to me there is a wheel), let us ride on it." The king's daughter rode with the old woman. She turned (the wheel) to the right, it ascended to the sky; she turned it to the left, it descended in a certain city. The king of that city gave the old woman a lak of tillas. The old woman took the tillas and went away.

Her grandson came (home); his wife is not (there). He became very troubled. He had a talking-bird, from it he enquired: "Whither has she gone?" The bird answered: "She has gone with the old woman." The grandson said: "How shall we do?" The bird said: "I will go round city by city and will search; if I find her, she will give me the ring." He said: "All right, go. Do not again — (?) me. The bird said: I will not — (?)

The bird went and searched; for several years it searched (and at last) found (them). The king's daughter gave the ring to the bird. The bird took it away and gave it to the old woman's grandson. He with the breath of the Prophet Solomon drew it on. His wife appeared, and he attained to his desire.



## TALES FROM FORBES'S GRAMMAR PUT INTO SARIQOLÎ.

1. I khalg az Aflatun pörst ki: Hüch sal ar-kima at  
a person from Plato asked that: Many years to ship (thou)  
vüd, daryâ safar at chaug; ar daryâ tsèz tamâshâ at wând?  
wast sea voyage (thou) madest to sea what strange things (thou) sawest?

Levd ko: 'Ajab yü vüd az daryâ pa mi kâsh am faribt  
Replied that strange this was from sea to this shore (I) arrived.

2. I gadai bâi pa darwâza sût î chîzi tâlibt.  
a beggar rich man's to door went a thing (something) desired  
Chéd az darün jawâb yât ko khanzòh pa chéd niest. Gadai levd  
House from inside answer came that lady at home is not. Beggar said  
ko: I kônd khpik am tâlibtjit a-khanzòh am na talibtjit  
that: a piece of bread (I) had desired (acc.) lady (I) not had desired  
ko dós jawâb am vüg.  
that such answer (I) obtained.

3. I habîb har-wâkt pa kabristân set-ar vüd, khü  
a (certain) doctor whenever to grave-yard was-going own  
châdir kh' ar-kâl kh' ar-pets parwîd-ar-vüd. Mardum pörst ko:  
scarf own to head own to face used-to-wrap. Men asked that:  
Mi sabab tsèz? Levd ko: Az mi kabristân-enj murdhâ kha-  
Of this reason what? He said that from this grave-yard (adj.) corpses asham-  
jal som, wi ivon choi mu av dawâ-av khügj maugj.  
ed I am (I go) because whoever my (they) medicines have eaten have died.

4. I mâth i pâdkhâh shahzáda katti ghiéu nakhtüg; Khér jürm  
one day a king prince with hunting went out air hot  
sût. Pâdkhâh at shahzáda khü 'v lél maskharah chü sevd  
became. King and prince own (they) cloaks jester's on back  
lachaug. Pâdkhâh shîind levd: Eh maskharah! tü indér i shér wez  
placed. King smiled said: Oh jester thee on an ass's load  
yost. Maskharah levd ko: Badki dhá shér wez.  
is. Jester said that: Yes two ass's loads.

5. Khalg i duk-ar av levd ko: Talâb-â ko tü  
People a crook-back to (they) said that: Desirest thou that thy  
dom khez tsa-sáod, yu judu khalg dom tü rang cherd tsa-  
back straight should-become, or other people's backs thy like crooked should  
sáod? Levd ko: Talâb-am ko judu khalg dom duk tsa-  
become? He said that: I desire that other people's backs crooked should  
sáod, wi-ivon wi tsem katti a-mu weinin, waz a-wif  
become, because (so that) those eyes with (acc.) me they see, I (acc.) them  
tsa weinam.  
may see.



6. I mǎth i pǎdkhǎh i ar sha'ir zar sūt. Jallād-ir ramod  
 one day a king a to poet angry became. Executioner to ordered  
 ko: mu prūt zân. Jallād a-medhj veg-ir tūid. Sha'ir  
 that: (in) my presence slay. Executioner (acc.) sword to-fetch went. Part  
 hāzirav-ir levd ko: a mu chupatak dhòid, ko pǎdkhǎh khush  
 present people-to said that: (acc.) me slaps strike ye, that king happy  
 sáod. Pǎdkhǎh shiind; u az gunáh nárzéd.  
 may be. King smiled; and from fault passed over.

7. I khalg laur martabah vüg. I dest wi'r prūt a-  
 a person great dignity obtained. A friend to him before (acc.)  
 wi wánd-ir sūt. Wi dest pōrst ko: Chói táó? tséz-ar  
 him in order to see went. His friend asked that: who (art) thou? what for  
 at yát? Yü dest kharmindeh sūt. Levd ko: A-mu na  
 (thou) camest? That friend ashamed became. He said that: (acc.) Me no  
 padzân-â. Tū-yan qadím-inj dest am waz. Mátam ivon am tu  
 knowest? Of-thine old (adj.) friend (I) I. Condolence for (I) those  
 prūt yát, khedhjít-am táó at kaur sedhj.  
 before came, I had heard thou (thou) blind hast become.

8. I khalg i darwésh dastúr zukht ratsüst. Darwésh ar-ḡabristân  
 a person a beggar's turban took fled. Beggar to grave-yard  
 sūt nalüst. Mardum wi-'r levd ko: "Yü ádam tū dastúr tar  
 went sat down. Men him to said that: "That man thy turban towards  
 bâgh-gunah yūd, tséz ivon at ar-ḡabristân nalüstj,  
 garden direction took away, what for (thou) to grave-yard hast sat down,  
 tséz kan áud?" Levd ko: "Yü mas akhír áud yádh; wi  
 what doest here?" He said that: "He also at last here will come; that  
 ivon am áud nalüstj.  
 for (I) here have sat down.

## SARIKOLI TALES.

### I

1. I nék i badh vüd. 2. Wodh dháu av safar tūid. 3. Chan-  
 dín mǎth av pond tūid. 4. Wi kech marzun sūt. 5. Nek levd badh-ir:  
 I ghov khpik mu'r dhâ. 6. Badh levd ko: Táó kh' tsem kaur kan, tom waz  
 tū'r dhâm. 7. Nek khū tsem chafând, azūm av tūid. 8. Chandín mǎth-  
 onj pond av tūid. Wâz wi kech marzun sūt. 9. Nék levd ko: I ghov khpik  
 mu'r dhâ. 10. Badh levd ko: I sari tsem mas chafân, tom tū'r dhâm.  
 11. Virt tsem kaur sūt. Badh tūid, nek réid. 12. I mǎth chū biur nalüst.  
 Khum (sham) sūt. I kūd yát. 13. Kūd az dhum wadhord. Kūd a-wi kutal-  
 khū yūd. I pa garmâ duwust at khâb sūt. 14. B'ad az waḡt i khithp  
 i yürkhi i rapti i void yát. Yürkhi az rapti pōrst ko: Táó at ko-júi vüd



15. Raps levd ko : Waz am nür pädkhâh ar-khâr (shahr) vüd. 16. Yürkh levd ko : Tsèz khabar yost ? Raps levd ko : Pädkhâh khü wazir-av katti dar ghazab sedhj. Pädkhâh-an i radzin kaur sedhj. Pädkhâh khü wazir-av-ir levd ko : Tamâsh tabîb varéit vòrit. 17. Khithp levd ko : Eh ahmâk at Pädkhâh ! tü mul ar-darün i khöin réidz yost. A-wi réidz tsa vird, reidz ar-past tsa zôzd, wi tsem tázo saod. 18. Yürkh levd ko : Eh ahmâk at ! garmâ prut i sávz chinâr yost. Chinâr pa bün i kaul yost. Har rang kaur tsa víd, az chinâr wadhord, i dhüst ar kaul dhíd, az kaul zôzd tar chinâr roft, az chinâr zôzd, khü tar tsem roft, wi tsem tázo saod.

19. A-di gap garma-yenj kaur khüd ; pigan azüm indâud nákhtüg. 20. Süt chinâr pa bün. Az chinâr wadhord, khü a-dhüst dhöd ar-kaul, rift tar chinâr ; rift khü tar tsem. Wi tsem tázo süt. 21. Azüm indâud tüid. Pädkhâh ar-khâr süt, ko Pädkhâh a-wazir-av jam' chaugj. 22. Az wazir-av pörst ko : "Nür tamâsh-ir dhés máth-onj qarâr vüd. Nür a-tamâsh zân-am." 23. Nék levd ko : Eh ! Pädkhâh 'Alam, mef a-gunâh i máth-onj talâb-am. Pädkhâh levd ko : Ma'aqul. 24. Nék levd ko : mu'r hukm saud-ô Pädkhâh radzin a-tsem tázo kan-am. 25. Pädkhâh levd ko : mu radzin a-tsem tázo kan-ô a-wi tür dhâm. 26. Nék levd ko : Tü ar-mâl i khöin réidz yost. Mu'r vör. 27. A-wi réidz vaug kökht. Wi a-talkhâ zukht. Pädkhâh radzin chü-tsem vüst. Wi tsem tázo süt. 28. Pigân-adh Pädkhâh-ar khabar süt radzin tsem tázo süt. Pädkhâh khush-waqt süt. Levd ko : kiw káit vorid. 29. Pädkhâh khez av yât. Levd ko : khü radzin tür tsa dhâm khush-waqt soy-â. 30. Nék levd ko : Eh ! Pädkhâh ! tao pid waz pôts. Khü a-radzin nek-ir dhâd. 31. Pädkhâh levd ko : Eh ! pôts, nakhti chü takht. Nék nakhtüg chü takht.

32. Chandín máth az-zabô badh yât. "As-salám aleikum." Nék levd ko : "Aleikum as-salám. Tsèz talâb tü-yan yost." 33. Badh levd ko : "Eh ! Pädkhâh. Ghazína-i-ghaib az tü talâb-am." Levd ko : "Chârj saud, Só, falân jâi i garmâ yost. Garma pa darün durr khurjin yost ; lá'l sandîk yost ; a-wi mur zôz vor ; lá'l sandîk mur-i, durr khurjin tür-i." 34. Khair az-üm rawán süt tüid. Süt garma pa darün. Khég-ir âsh, pamég-ir lél, az i chiz be-'âjat. 35. Badh levd ko : Eh Khuda ! waz am dhéw sedhj-â, a-mi pädkhâh-'r yussam-â. Khü-bath khor-am alâsam. 36. Khair ; khâb süt. Yürkh, void, khithp, raps yât. Ghaul wodhd ko : Az darün sherfâ nakhtüg. 37. Khithp levd ko : Eh ! yürkh, i shâm kan. Yürkh a-shâm zukht ; a-divír hat chaug. Khalg nalüs. 38. Yürkh khuj dhaug ; imi'r taklif chaug ; khithp déid. Wi kech kond chaug. Badh maug.

## II.

1. I churik-an haròl pôts vüd. I mâth churik wasiyat chaug ko : Albatta, albatta, kénò khadorj yost, pa khadhorj i-tsemi bâbâ yost, wi khez ma sô, yû âdam khird. Levd, maug. 2. Pôts khèl levd ko : Mâsh sôn.



Dzül pöts levd ko : na sôm. Laur pöts levd ko : sôm. 3. Azüm sût, levd ko : As-salâm aleikum, wa aleikum as-salâm. Sehat-at-â. Levd shükri. 4. Levd ko : Eh pöts, ko jui so. Levd ko, mu'-âtâ-an [pron. m'átâ'n] ghazîna vüd par-wi am yât. 5. Bâbâ levd ko : Eh pöts ! be waqt at yithj. Nûr aud khâb-ar risan. Yû ghadhâ khâb-ar réid. 6. Bâbâ levd ko : Tao mu'r farzand sô, waz khû radzin tür dhâm. 7. Levd ko ; Tsèz kizmat tür kan-am. Bâbâ levd ko : I shèr yost, wi surun patao. Mu-yan i khislat yost. Tü kâhr yâdh-d-ô waz tü a tsem kau-am. Mu'r kâhr yâdh-d-ô, tao mu a tsem kau. Ghadhâ levd ko : Ma'akûl.

8. Pigan indaud ; i ketman wi'r dhâd. "Sô, sher surun patao." Ghadhâ sût, ko divîr hât na sût a-divîr az garg chaug deid. 9. I mâtch chû-biur tizd, adâ na sût. Yât, a-ketman pataod. 10. Churik levd ko : Tü kâhr yât-â. Ghadhâ levd ko : Mu kâhr nei, ko tao at a mu zed. 11. Churik indaud, wi tsem kaud. 12. Dhau-âo pöts uz yât. Churik levd ko : Eh pöts tsèz-ar at yât ? Ghadhâ levd ko : Khâb i vrôd mu-yan (y)ithjit. A-wi am khkaig-ir yât. 13. Churik levd ko : khuj ma dhor. Tü âtâ-an fulân jûi ghazîna yost. Tü vrôd par wi tüid. 14. Tao mu'r khez nith. I shèr mu-yan yost ; tao wi surun patao. Waz khû radzin tür dhâm. 15. Ghadhâ pigan-ath nakhtüg. Shèr a-surun pataod. 16. Churik levd ko : Pigan az jangal zez vôr. Shèr-ar levd ko : Chû tü g-dhakhtô tao alâs. 17. Ghadhâ a-shèr det tüid. Az jangal zez chû shèr dhakht. Shèr alüid indaid-ir na chimbd. 18. Ghadhâ a-chog tizd. Wi ghaul khehakht. 19. Shèr azüm a-zèz zukht ratsüst, yât pa divîr. 20. Churik pörst ko : Eh Shèr ! tao at tsa'r yât. Shèr levd ko : Eh kaur ! tao mu ghaul na wain-â. Ghadhâ mu ghaul khehakht. 21. Churik levd ko : Ah bala ! shèr ghaul at tsa'r khehakht. Ghadhâ levd ko : Ah pid ! tu kâhr yât-â. 21. Churik levd : Mu kâhr yât. Ghadhâ zibet, wi tsem kaud. Churik maug.

### III.

1. I bâi vüd. Bâi-an harôi pöts vüd, dhâ'r gal dhâ 'azâr mào vüd. 2. I mâtch levd ko : Sô pöts, az mâl khabar zôz. Laur pöts, tuid, a-mâl jama' chaug, ar-gal dhâd. Khâb pa divîr khuvd. 3. Barâbari khâb vüd ko dhâ vurjîn yât, a-mâl az gal det. Wi laur pöts pâdkhâh a-radzin wadhord. 4. Radzin levd ko : a-mu ma wadhor, mâl mu-yan. Laur pöts levd ko : mu-yan. 5. Radzin levd ko : tao a mu zôz. Waz a-mâl na dem. Laur pöts levd ko : Waz a-tu zôz-am ; waz som kh' âtâ khez. 6. Azüm sût khû âtâ khez. Âtâ levd ko ; Bala ! tsèz hayal at sût. 7. Levd Pâdkhâh radzin a-mâl mu'r na dhâd. Âtâ levd : Tsèz-ir na dhâd. 8. Pâdkhâh radzin levd ko ; Bâi a-mu kh' pöts-ir dhid-ô, waz a-mâl dhâm. 9. Âtâ pörst ko : Pâdkhâh radzin yûs-â. Laur pöts levd ko, na yûs-am. 10. Az madhân-sedhj pöts pörst : Pâdkhâh radzin yûs-â. Wi levd. Na yusam. 11. Az dzül pöts pörst ; Levd ko yûsam. Pid levd ko : te sôn. 12. Sût Pâdkhâh khez. Pâdkhâh khû radzin dhâd.



13. Mardum mubâarak-bâd-ir yât : "Ha Pâdkhâh ! mubâarak vîd, mubâarak vîd. Khub Pâdkhâh at vedhj. Makhorj darakht tû-yan na vedhj."

14. Levđ ko : A-mi chòl vareid. Mardum levđ ko : A-mi tû dâmâd varéid. 15. Wi dâmâd khaffa sût, levđ ko : Rozagâr i nek khez sôm. Levđ, sô. 16. Azûm sût. Levđ ko : Eh Rozagâr i nek ! Pâdkhâh mu'r levđ ko : Makhorj darakht varé. Waz az ku varéam. 17. Wi ghin levđ : Gham ma kan. Nêw past khû'r shira tâz. Nêw past khû vurj-ir shira tâz.

Ar-vurj suwâr sô.....vurj a-tû daryâ pa-lab yûst, khû vurj-ar chil kamchi dhâ, vurj ar-daryâ (?) ghût dhîd.....

#### LITERAL TRANSLATION OF THE ABOVE.

##### I.

1. (There) were (two men,) one good (and) one bad. 2. They went a journey. 3. (They) went several days' road. 4. Their stomachs became hungry. 5. The good (one) said to the bad : Give me a piece of bread. 6. The bad one said : Thou, make (thine) own eye blind, then I will give thee (some bread). 7. The good (one) pierced (his) own eye. Thence they went (on). 8. Several days' road they went. Again their stomachs became hungry. 9. The good (one) said : Give me a piece of bread. 10. The bad (one) said : Pierce also the eye (of the) one side (which remains), then I will give thee (some bread). 11. Both (his) eyes (thus) became blind. The bad (one) went (on), the good (one) remained. 12. He sat one day on (till) evening. (It) became evening. A dog came. 13. He laid hold by the dog's tail [lit. dog's from tail]. The dog leading (him) took him away. Brought him into a cave and went (to) sleep.

14. After a time, a wolf, a bear, a fox, a night-mare (!) came. The bear asked the fox : Thou, where wert thou ? 15. The fox said : I was to-day to (at) the king's town. 16. The bear said : What news is (there) ? The fox said : The king has become angry with his Wazîrs. A daughter of the king's has become blind. The king said to his Wazîrs : Find a doctor (and) bring (him). 17. The wolf said : Ah ! thou (art) a foolish king. Amongst thy flocks [lit. thy flocks' to inside] (there) is a blue goat. If he brings that goat, (and) takes the goat's skin, her eyes will become (renewed). 18. The bear said : Ah ! thou fool, before the cave (there) is a green plane-tree. At the foot of the plane-tree (there) is a pool. What kind so-ever (of) blind person (there) may be, (if) he lays hold of the plane-tree, puts [strikes] one hand into the pool, takes (water) from the pool, smears (it) on to the plane-tree, takes from the plane-tree, (and) smears (it) on to (his) own eyes, his eyes will become renewed.



19. The blind man who was in the cave [lit. the in-the-cave (adj.) blind man] heard this speech ; next day he rose up thence (and) went out. 20. He went to the foot of the plane-tree. He laid hold of the plane-tree, struck his hand into the pool, smeared (water) on to the plane-tree, smeared [to] his own eyes. His eyes became renewed. 21. He rose up thence (and) went (away). He went to the king's city ; when [that] the king had [has] assembled (his) wazirs. 22. He interrogated his wazirs (saying) : To-day, your ten days' agreement is up [lit. to you ten-days' (adj.) agreement was]. To-day I slay you. 23. The good (hero of the tale) said : Oh king of the world ! I beg (off the punishment of) their fault for one day. The king said : All right. 24. The good one said : If the order be (given) to me, I will cure (renew) the eyes of the king's daughter. 25. The king said : If thou curest my daughter's eyes, I will give her to thee. 26. The good one said : Amongst thy flocks (there) is a blue goat. Bring (it) to me. 27. He brought that goat (and) flayed (it). He took its gall (and) bound (it) on to the eyes of the king's daughter. Her eyes became renewed. 28. Next morning news went to the king (that) (his) daughter's eyes were cured. The king rejoiced. He said : Call (them and) bring (them). They came before the king. He said : If I give thee my daughter wilt thou be glad. 30. The good one said : Oh king ! thou (art my) father, I (am thy) son. He gave his daughter to the good one. 31. The king said : Oh son ! mount on the throne. The good one mounted on the throne.

32. After some days the bad one came. (He said) Peace be with you. The good one replied : And with you be peace. What is thy desire [lit. what desire of thine is (there)]. 33. The bad one said : Oh king ! I desire a hidden treasure from thee. He replied : (It) is good. Go, in such a place (there) is a cave. Inside the cave (there) is a sack of pearls, (there) is a box of rubies. Take (and) bring them [it] to me. The box of rubies (shall be) for me, the sack of pearls for thee. 34. Well, thence he started (and) went. He went into the cave. (There was) food to eat, clothes to put on, no lack of any thing [lit. from one thing not lack]. 35. The bad one said : Oh God ! have I become mad ? Shall I take this to the king ? By myself I will eat, I will lie down. 36. Well, (it) became night. The bear, the night-mare, the wolf, the fox, came. (They) gave ear (and heard) that a sound came from within. 37. The wolf said : Oh bear ! show [make] a light. The bear took (a) candle (and) opened the door. (A) person was sitting (there) [lit. person has sat down]. 38. The bear felt fear ; each invited the other (to enter) [lit. one to this one gave trouble\*].

\* The expression, *taklif kardan*, "to give trouble," "to trouble," is a common oriental one for "inviting in", answering to the French "donnez-vous la peine d'entrer."





The wolf entered. He tore [made] his stomach (to) pieces. The bad one died.

## II.

1. A (certain) man had three sons [lit. of one man (there) were three sons]. One day the man gave (them) a dying warning, (saying): Truly, truly; (there) is an old mill; in the mill (there) is a one-eyed old man; go not before him; he eats men. He said (and) died. 2. The sons said: We will go. The younger [little] son said: I go not. The elder son said: I go. 3. Thence he went (and) said: The peace be with you. (The old man replied) And with you be the peace. Art thou in (good) health? (The son) replied: Thanks. 4. (The old man) said: Oh (my) son! whither goest thou? He replied: There was a treasure of my father's. To (seek) it I come. 5. The old man said: Oh son! thou hast come untimely. To-day we will remain here for the night. That boy remained for the night. 6. The old man said: (Do) thou become a son to me; I will give thee my daughter. 7. He said: What service shall I do thee? The old man replied: (There) is an ass, throw away its dung. (There) is a custom of mine. If thine anger comes (if thou becomest angry), I will dig out thine eyes. If my anger comes, (do) thou dig out my eyes. The boy said: All right.

8. Next day he rose (and) gave him a hoe (saying): Go, cast away the ass's dung. The boy went (and found) that the door (would) not open. He took [made] the door off its hinge (and) entered. 9. (For) a (whole) day till evening he removed (the dung). (The work) was not completed. He came (in, and) threw down the hoe. 10. The man said: Has thy anger come? The boy replied: Am I not angry [lit. my anger not?] that thou (hast) killed me (with hard work). 11. The man arose (and) dug out his eyes. 12. The second son again, came. The man said: Oh son! what for (hast) thou come? The boy replied: (Last) night a brother of mine had come (here). I came in order to seek him. 13. The man said: Feel not afraid; (there) is a treasury of thy father's in such a place; thy brother (is) gone to it. 14. (Do) thou sit down before me. (There) is an ass of mine. (Do) thou cast away its dung. I will give thee my daughter. 15. Next day the boy went out. He cast away the ass's dung. 16. The man said: To-morrow bring fuel from the forest. To the ass he said: If he loads (it) on thee, (do thou) lie down. 17. The boy drove the ass (and) went. He loaded fuel from the forest on the ass. The ass lay down, and consented not to get up (again). 18. The boy drew (his) knife (and) cut off its ear. 19. The ass took the (load of) fuel thence, (and) ran away, (and) came to the door. 20. The man asked: Oh ass! what for (art) thou come. The ass replied: Eh!



(thou) blind man, seest thou not my ear? The boy (has) cut off my ear. 21. The man said: Oh child! what for (hast) thou cut off the ass's ear? The boy replied: Oh father! (has) thy anger come? 22. The man said: "My anger (has) come." The boy sprung up (and) dug out his eyes. The man died.

### III.

1. (There) was a rich man. The rich man had three sons. In two folds (there) were two thousand sheep. 2. One day he said: Go, son, (and) take knowledge of the flocks. The eldest son went (and) gathered together the flocks, and put (gave) them into the folds. At night he slept at the door. 3. The night was over (?) when two horsemen came, (and) drove the flocks from the fold. That eldest son seized (one of the riders who turned out to be) the king's daughter. 4. The girl said: Seize me not, the flocks (are) mine. The eldest son replied: Mine. 5. The girl said: (Do) thou take me (to wife); I will not drive (away) the flocks. The eldest son said: I will take thee (to wife). I will go before my father. 6. He went thence (and came) before his father. The father said: Child! What delay has occurred to thee? 7. He said: The king's daughter (would) not give me the flocks. The father said: What for did she not give (them)? 8. The king's daughter replied: If the rich man gives me to his son (to wife), I will give up the flocks. 9. The father asked: Wilt thou take the king's daughter? The eldest son replied: I will not take (her). 10. He asked the second son [lit. from middle-being son]: Wilt thou take the king's daughter (to wife)? That (one) replied: I will not take her. 11. He asked the youngest [little] son. He replied: "I will take her." The father said: (—) We will go. 12. They went before the king. The king gave his daughter.

13. People came to (make their) congratulations. "Well, King! may (she) be happy, may (she) be happy! Thou hast been a good king. (But) thou hast not possessed a coral tree [lit. a coral tree of thine has not existed]." 14. He said: Who shall find this? The men replied: Thy son-in-law will find this. 15. His son-in-law became troubled. He said: I will go before my wife [lit. my good allotment or portion].\* (The king) replied: Go. 16. Thence he went, and said: Oh wife! the king (has) said to me, Find a coral tree. Whence shall I find (it)? 17. His wife said: Grieve not. Draw on nine skins (as a) covering to thyself. Draw on nine skins (as a) covering to thy horse. Mount the horse . . . the horse will take thee to the river bank; strike thy horse forty (strokes of the) whip, the horse will plunge into the river. . . .

[The remainder of the MS. has become undecipherable.]

\* A curious periphrasis to avoid saying "wife."



## COMPARATIVE TABLE

showing the connection of the Ghalchah Languages with neighbouring Tongues.

| ENGLISH. | INDIAN.        |                          | DÆDU.     | GHALCHAH.       | PERSIAN.                  |                |
|----------|----------------|--------------------------|-----------|-----------------|---------------------------|----------------|
|          | <i>Modern.</i> | <i>Ancient.</i>          |           |                 | <i>Ancient.</i>           | <i>Modern.</i> |
| father   | ... bap        | ... pitar, tãta          | ... tãt   | ... tãt, pid    | ... pitar,                | ... padar      |
| mother   | ... mã         | ... mãtar, nanã          | ... nann  | ... nãn         | ... mãtar,                | ... mãdar      |
| son      | ... putr       | ... putra                | ... putsh | ... pũts, pũtr  | ... puthra,               | ... pĩsar      |
| daughter | ... dhĩ        | ... dubitar              | ... dih   | ... dhagd       | ... dughdar,              | ... dukhtar    |
| brother  | ... bhrãta     | ... bhrãtar              | ... birãr | ... brãt, vrũt  | ... brãtar,               | ... brãdar     |
| wife     | ...            | kanta                    | ...       | kũnd            | ...                       | ...            |
| "        | ...            | jani                     | ...       | ghũn            | ... ghenã,                | ... zan        |
| woman    | ... istĩrĩ     | ... strĩ                 | ... strĩa | ... stir, strei | ... stri                  | ...            |
| child    | ...            | jata                     | ...       | gãts [gir]      | ... zãda,                 | ... zãda       |
| grandson | ...            | naptar                   | ...       | napũs, nabũs    | ... naptar,               | ... nabĩr      |
| heart    | ... hirda      | ... hřidayã              | ... hardi | ... zãrd        | ... zãredhaya             | ...            |
| stomach  | ... ojhřĩ      | ... udara                | ... derr  | ... dur         | ... udara                 | ...            |
| head     | ...            | řĩras                    | ... sorr  | ... sãr         | ... sãrã,                 | ... sar        |
| eye      | ... ãnkh       | ... chakshu, akshi atchi | ...       | ... chũzm, tsem | ... chashman, ashi chashm | ...            |



|              |     |     |        |                 |                           |              |             |
|--------------|-----|-----|--------|-----------------|---------------------------|--------------|-------------|
| eyebrow      | ... | ... | bhru   | ... bru         | ... vao                   | ... brvat,   | ... abru    |
| ear          | ... | ... | ghôsha | ...             | ghish                     | ... gaosha,  | ... gôsh    |
| nose         | ... | ... | nak    | ... naskart     | ... nâz                   | ... naouba   | ... bini    |
| tooth        | ... | ... | dant   | ... donn        | ... dündük, dhândân       | ... dāntan,  | ... dandân  |
| beard        | ... | ... | dārhi  | ... argish      | ... regish                | ... ruésa,   | ... rish    |
| breast       | ... | ... | ...    | ... pás         | ... püz, poz              | ...          | ...         |
| bosom        | ... | ... | ...    | ... chuchô      | ... chiiji                | ...          | ...         |
| hand         | ... | ... | hâth   | ... host        | ... dhast, dhüst          | ... zasta,   | ... dast    |
| foot, leg    | ... | ... | pâyw   | ... pa, pong    | ... pûdh, pedh            | ... padha,   | ... pâ      |
| blood        | ... | ... | lohù   | ...             | ... wukhan, wakhîn        | ... vohuni,  | ... khûn    |
| knee         | ... | ... | jânu   | ...             | ... zân                   | ... znu,     | ... zânu    |
| bone         | ... | ... | hadî   | ... ati         | ... astak                 | ... asti,    | ... ustkhân |
| hair         | ... | ... | ...    | ... dyâko       | ... dâkhs                 | ...          | ...         |
| mouth        | ... | ... | ...    | ... ûst         | ... ghâsh                 | ...          | ...         |
| finger       | ... | ... | ungli  | ... angui       | { yangl, ingakht*<br>(sh) | } angusta,   | ... angusht |
| tongue       | ... | ... | jîbh   | ... jîpp        | ... ziv                   | ... lizva,   | ... zabân   |
| name         | ... | ... | nâm    | ... nom, nâm    | ... nung, nâm             | ... naman,   | ... nâm     |
| plant, grass | ... | ... | ...    | ... ôtch, djosh | ... vakhsh, osh           | ... vakhsh ? | [to grow]   |
| kiss         | ... | ... | ...    | ... ma          | ... bâ                    | ...          | ... bosah   |

\* The sound *kh* in Sariḳolî and Wakhi often represents the *sh* of another cognate tongue. Thus P. *shab* is in Sariḳolî *khâb* &c. The Gaddîs, a hill tribe of the Kángará district (Panjâb) have a similar peculiarity of pronunciation; e. g., *Dharmkhâla* for *Dharmasala*; *khan* for *san* (hundred), &c.



| ENGLISH. | INDIAN.   |                    | DARDU.     | GHALCHAH.                | PERSIAN.                |                |
|----------|-----------|--------------------|------------|--------------------------|-------------------------|----------------|
|          | Modern.   | Ancient.           |            |                          | Ancient.                | Modern.        |
| road     | ... bat   | ... pathin         | ... poun   | { pând<br>vadhak         | ... paûta<br>... pathan | ...            |
| apricot  | ...       | ...                | ...        | ... cheri                | ...                     | ...            |
| work     | ...       | ...                | ...        | ... yark                 | ...                     | ...            |
| snow     | ... hiûn  | ... arjana (εργον) | ...        | ... zam                  | ... zima                | ... zam [cold] |
| star     | ... tarâ  | ... star           | ... istâri | ... stâr, khturj<br>(sh) | ... stare,              | ... sitâra     |
| sun      | ... sûrij | ... svar           | ... yorr   | ... yir, khêr            | ... hvare,              | ... khûr       |
| water    | ...       | ...                | ... uk     | ... vik, yupk            | ...                     | ...            |
| bow      | ...       | ... dhanvan        | ... tshong | ... tsan                 | ... thanvana            | ...            |
| bread    | ...       | ...                | ... shapik | ... khpik<br>(sh)        | ...                     | ...            |
| door     | ... dwâra | ... dvâra          | ... darr   | ... divir                | ... dvara,              | ... dar        |
| cat      | ... púsâ  | ...                | ... pushi  | ... pish                 | ...                     | ... pushak     |
| cow      | ... gau   | ... go             | ... go     | ... ghû                  | ... gâo,                | ... gâo        |
| crow     | ... kâg   | ... kâga           | ... kagh   | ... kargha*              | ...                     | ...            |
| earth    | ...       | ... jîmâ           | ... samun  | ... zems                 | ... zem,                | ... zamîn      |
| milk     | ... chîr  | ... kshira         | ... tshirr | ... kashîr               | ... khshira,            | ... shir       |
| moon     | ...       | ... mâsa           | ... mâs    | ... mûi, mâs             | ... mâonh,              | ... mâh        |
| month    | ...       | ... mâsa           | ... mâtz   | ... zûmâk, mâs           | ... mâonh,              | ... mâh        |

\* This is the same in Turki however. They are all probably onomatopoeic.



|                |                  |               |                |                          |                           |
|----------------|------------------|---------------|----------------|--------------------------|---------------------------|
| rock, mountain | ... gir          | ... giri      | ... giri       | ... ghar, zèr ...        | ... gairi                 |
| horse          | ...              | ...           | ... ashp       | ... yasap, yàsh          | ... aspa, ... asp         |
| little         | ...              | ...           | ... tzak       | ... dzak                 | ...                       |
| new            | ... nàya         | ... nava      | ... noch       | ... nūj                  | ... nau                   |
| big            | ...              | ...           | lut            | ... lup                  | ...                       |
| black          | ...              | ... syava     | ... shà        | ... shù                  | ... siyah                 |
| white          | ...              | ... sveta     | ... (i)shperro | ... spèid                | ... safèd, sapèd          |
| me             | { main<br>mujh } | ma—           | ... ma         | ... ma—, maz, mù         | ... ma—                   |
| thou           | ... tu           | ... twa—      | ... tu         | ... tu                   | { tùm,<br>thwa } tu—      |
| we, us         | ... ham          | ... asma—     | ... ispa       | ... spa [gen.], masha... | ... masha                 |
| one            | ... ek           | ... eka       | ... i,         | ... iv, i                | ... yak                   |
| two            | ... do           | ... dvi       | ... dju        | ... búi, dhào            | ... do                    |
| three          | ... tin          | ... trayas    | ... troy       | ... harvi, trúi          | ... seh                   |
| four           | ... char         | ... chatváras | ... chor       | ... tsavur, tsabúr       | ... chathwáro, ... chahár |
| five           | ... panch        | ... panchan   | ... ponch      | ... pinz, pânz           | ... panj                  |
| six            | ... chheh        | ... shat      | ... chòi       | ... shádh, khel          | ... shash                 |
| seven          | ... sát          | ... saptan    | ... sòt        | ... hūb, hüvd            | ... haft                  |
| eight          | ... áth          | ... ashtan    | ... osht       | ... wokht                | ... basht                 |
| nine           | ... nao          | ... navan     | ... nõ         | ... nõw, nõo             | ... noh                   |
| ten            | ... das          | ... dasan     | ... djosh      | ... dhas, dhes           | ... dah                   |

(ah)



| ENGLISH.          | INDIAN.        |                     | DARDE.       | GHALCHAH.                 | PERSIAN.            |                |
|-------------------|----------------|---------------------|--------------|---------------------------|---------------------|----------------|
|                   | <i>Modern.</i> | <i>Ancient.</i>     |              |                           | <i>Ancient.</i>     | <i>Modern.</i> |
| eleven            | ... igarah     | ...                 | djosh-i ...  | ... dhas-i, dhes-at-i ... | ... aèva-dasan ...  | ... yazdah     |
| fifteen           | ... pandrah    | ...                 | djosh-ponch  | ... dhas-pinz...          | ... pancha-dasan, . | ... pānzdah    |
| to cook, to ripen | ... pak-na     | ... pach            | ... paj-ono  | ... pōch-an ...           | ... pach,           | ... pukhtan    |
| to hear           | ... sun-na     | ... sru             | ... shunn    | ... kshuūn, khūd-ao ...   | ... sru,            | ... shanidan   |
| to write          | ...            | ...                 | niwashe ...  | ... nevish-an             | ...                 | ... nawishtan  |
| he drinks         | ... pita       | ...                 | pīe          | ... pīt                   | ...                 | ...            |
| I know            | ...            | ...                 | dashtam ...  | ... disham ...            | ...                 | ...            |
| to strike         | ...            | ... han             | ... det ?    | ... ding, dhād-ao ...     | ... jan,            | ... zadan      |
| it broke          | ...            | ... chhid           | ... chiddi   | ... shkōttēi [shkōnd]     | ... skend,          | ... shikast    |
| to die            | ... marna      | ... mar             | ... miri-ōno | ... mara-in ...           | ... mar,            | ... murdan     |
| with              | ...            | ...                 | { kath       | ... katti                 | ...                 | ...            |
| bull              | ...            | ...                 | { batsban    | ... mōshōn                | ...                 | ...            |
| "                 | ...            | ...                 | ...          | ghū-rgāu ...              | ...                 | ...            |
| calf              | ...            | ... gō-rājā         | ...          | ... wierz                 | ...                 | ...            |
| lamb              | ...            | ... vrsha           | ...          | wurk, barkā               | ...                 | ...            |
| horse             | ...            | ... varkara         | ...          | wushk, wishk              | ...                 | ...            |
| frog              | ...            | ... vashkaya        | ...          | vurj                      | ...                 | ...            |
| bear              | ...            | ... vrshala         | ...          | sher-bich, karbej         | ...                 | ...            |
| ram               | ...            | ... bhēki           | ...          | yūrkh                     | ...                 | ...            |
| leaf              | ...            | ... rīchh           | ...          | wār                       | ...                 | ...            |
|                   | ...            | ... ura             | ...          | wiēn                      | ...                 | ...            |
|                   | ...            | ... urnu (lamb) ... | ... urin     | pach                      | ...                 | ...            |
|                   | ...            | ... bala            | ...          |                           | ...                 | ...            |



|                               |     |           |     |                                     |     |          |                        |          |                          |               |               |
|-------------------------------|-----|-----------|-----|-------------------------------------|-----|----------|------------------------|----------|--------------------------|---------------|---------------|
| birch                         | ... | ... bhurj | ... | ... bhurja                          | ... | ...      | furz                   | ...      | ...                      | ...           | ...           |
| night                         | ... | ...       | ... | nactam                              | ... | ...      | naghd                  | ...      | ...                      | ...           | ...           |
| wild ram                      | ... | ...       | ... | ura<br>{ vara + ukshan }<br>(sheep) | ... | ...      | ...                    | vroksh   | ...                      | ...           | ...           |
| house                         | ... | ...       | ... | { sodas<br>chhada (roof) }          | ... | ...      | ched, khùn             | ...      | hadis,                   | ...           | khánah        |
| wheat                         | ... | ...       | ... | gódhuma                             | ... | ...      | ghidim, zandam         | ...      | ...                      | ...           | gandam        |
| cream                         | ... | ...       | ... | [marj "múl-<br>geo"]                | ... | ...      | marik                  | ...      | [marez<br>brush against] | ...           | "to ...       |
| ravine                        | ... | ...       | ... | dara                                | ... | ...      | dhór, dher             | ...      | ...                      | ...           | darrab        |
| this                          | ... | ...       | ... | ... ayam                            | ... | haya [?] | ...                    | yem, yam | ...                      | aém,          | ... in [im]   |
| first                         | ... | ...       | ... | ... prathamá                        | ... | ...      | prüt, prod             | ...      | ...                      | fratama       | ...           |
| bull                          | ... | ...       | ... | ukshan                              | ... | ...      | druksh                 | ...      | ...                      | ukshan        | ...           |
| cattle (esp. yak)             | ... | ...       | ... | sthúra                              | ... | ...      | staur                  | ...      | ...                      | staora,       | ... sutur     |
| sheep                         | ... | ...       | ... | mesha                               | ... | ...      | mài                    | ...      | ...                      | maésa         | ... mész      |
| a flower, (a sprig)           | ... | ...       | ... | ...                                 | ... | ...      | spargh...              | ...      | ...                      | [sparegha,    | ... spargham] |
| waist, also middle            | ... | ...       | ... | màdhya                              | ... | ...      | { madhán<br>màdh, medh | ...      | ...                      | maidhyana     | ... miyana    |
| a water-course                | ... | ...       | ... | vâhasa                              | ... | ...      | wâdh                   | ...      | ...                      | vaz [to flow] | ...           |
| rain                          | ... | ...       | ... | ... varsh                           | ... | ...      | wür, wareij            | ...      | ...                      | vàra          | ... bàrà      |
| male                          | ... | ...       | ... | ... nara                            | ... | ...      | nèr                    | ...      | ...                      | naira         | ... nar       |
| [other, further] side,<br>end | ... | ...       | ... | ... para                            | ... | ...      | pür, pur               | ...      | ...                      | para          | ...           |



| ENGLISH.         | INDIAN.    |                      | DARDU. | GHALCHAH.       | PERSIAN.       |             |
|------------------|------------|----------------------|--------|-----------------|----------------|-------------|
|                  | Modern.    | Ancient.             |        |                 | Ancient.       | Modern.     |
| day              | ...        | ...                  | ...    | rwâr            | ... ayare      | ...         |
| a charm          | ... mantr  | ... mantra           | ...    | mutr            | ... mâtira     | ...         |
| a demon or deity | ...        | deva                 | ...    | liw, dhéw...    | ... daéva      | div         |
| night            | ...        | kshapá               | ...    | khâb            | ... khshap     | shab        |
| sleep            | ...        | svapna               | ...    | khūdhm          | ... qafne      | kh'âb       |
| white [shining]  | ...        | ruch [to shine]      | ...    | rukhn           | ... ruksh      | [roshan]    |
|                  |            |                      |        |                 | (to shine) ... |             |
| sharp            | ...        | { tij }<br>{ tigma } | ...    | taghd, teid     | ... tighra     | ... tēz     |
| dry              | ... sūkha  | ... sushka           | ...    | wesk            | ... hisku,     | ... khushk  |
| putrid           | ...        | pû                   | ...    | pîtk, pedbj     | ... pûti       | ...         |
| there            | ...        | ...                  | ...    | hà-drà          | ... athra      | ...         |
| towards          | ...        | prati                | ...    | par             | ... paiti      | ...         |
| who?             | ... kis    | ... kas              | ...    | kûi, choi       | ... ko, chis   | ... kí      |
| thus             | ... aisa   | ... ithâ             | ...    | azi             | ... uiti       | ...         |
| before           | ...        | pra                  | ...    | prût, prod      | ... fra        | ...         |
| out              | ...        | ...                  | ...    | vich, vach      | ... uç         | ...         |
| I                | ...        | aham                 | ...    | wuz, waz [am]   | ... azem       | ...         |
| to burn          | ...        | tap                  | ...    | thaw-ak         | ... tafs       | ... tâftan  |
| to weave         | ...        | ve, vabh             | ...    | wuf-an, wift-ao | ... vap, ubda  | ... bâftan  |
| to cultivate     | ...        | karsh                | ...    | kûr-an          | ... kares      | ... kishtan |
| to milk          | ... doh-na | ... duh              | ...    | dhōgn-am        | ... dug        | ... dokhtan |



|                         |     |                          |                              |     |                                                       |             |
|-------------------------|-----|--------------------------|------------------------------|-----|-------------------------------------------------------|-------------|
| to praise               | ... | ...                      | stu                          | ... | sto-an, stand-ào ... stu                              | ... sitúdan |
| to give                 | ... | ... de-na                | ... dadâmi ( <i>I give</i> ) | ... | radhâ-n, dhâd-ào ... dadhâmi                          | ... dadan   |
| to see [ <i>I see</i> ] | ... | ...                      | vid                          | ... | win-am, wein-am... vaén                               | ... bin-am  |
| to lose                 | ... | ...                      | ...                          | ... | nūs-an, binâst-ào... naç, [ <i>venâçet</i> ,<br>Prsi] | ...         |
| to come                 | ... | ...                      | ...                          | ... | yêd-ào ... yaç                                        | ...         |
| to return               | ... | ...                      | ...                          | ... | pshû-n ... apasha [ <i>back-wards</i> ]               | ...         |
| to rise                 | ... | ...                      | ...                          | ... | giz-an ... khiz                                       | ... khez    |
| to lick                 | ... | ...                      | lih                          | ... | likh-an, dhikt-ào                                     | ...         |
| to dig                  | ... | ... khod-na              | ...                          | ... | kâud-ào                                               | ...         |
| a water-vessel          | ... | ... lota                 | ...                          | ... | lut, liet                                             | ...         |
| a dog                   | ... | ... kutta                | ...                          | ... | kūd                                                   | ...         |
| autumn                  | ... | ... [Bohemian]... podzim | ...                          | ... | pîdz                                                  | ...         |
| iron                    | ... | ... [Pushtu] ... ospana  | ...                          | ... | spin                                                  | ...         |
| moon                    | ... | ... [Anct. Slavo-nic]    | ... micetsi                  | ... | maesit                                                | ...         |

N. B.—Numerous other words apparently derived or corrupted from modern Persian, and also some from Arabic and Turkî, will be found on an inspection of the Vocabulary.





## VOCABULARY.

| A.                                                | <i>Wakhi.</i>                                     | <i>Sarikoli.</i>       |
|---------------------------------------------------|---------------------------------------------------|------------------------|
| to be able . . . .                                | *karsar-an<br>karsar-am<br>karkogn-am<br>karkakhk |                        |
| above, over (post position)                       | tša — wuch-an                                     | az — ter, — az tër     |
| above, up (adv.) . .                              | wuch . . . .                                      | tër                    |
| to abuse . . . . .                                | varend-àk . . . .                                 | rând-ao                |
|                                                   | vàrand-am . . . .                                 | rân-am                 |
|                                                   | vàratam . . . . .                                 | rând-am                |
|                                                   | vârendetk . . . . .                               | rândj                  |
| to accompany . . . .                              | kamtü wâtsn . . . .                               | kamtü set-ao . . . .   |
| account, number . .                               | asâb . . . . .                                    | asûb . . . . .         |
| on account of . . . .                             | — jinib . . . . .                                 | — ivòn . . . . .       |
| accoutrements . . .                               | asbâb . . . . .                                   | P. asbâb . . . . .     |
| acute (metaph.) . .                               | tiz . . . . .                                     | P. teiz . . . . .      |
| an adze . . . . .                                 | wajâk . . . . .                                   | wajâk . . . . .        |
| ill advised, who will not<br>take counsel . . . . | nazakhht . . . . .                                | nâghukht . . . . .     |
| to affect, to stain, to profit                    | nadhevs-an . . . . .                              | nâdhevd-ao . . . . .   |
|                                                   | nadhevs-am . . . . .                              | nâdhivs-am, nadhavs-t  |
|                                                   | nadhevd-am . . . . .                              | nâdhevd-am . . . . .   |
|                                                   | nadhâfk . . . . .                                 | nâdhevdj . . . . .     |
| to be afraid, to fear .                           | washuk-an . . . . .                               | khuj dheigao . . . . . |
|                                                   | washi-am . . . . .                                | — dhor-am . . . . .    |
|                                                   | washt-am . . . . .                                | — dhaug-am . . . . .   |
|                                                   | wusheth . . . . .                                 | — dhaugj . . . . .     |
| afresh . . . . .                                  | tša-sar-an . . . . .                              | az kar . . . . .       |
| after (p. p.) . . . .                             | tša — an sibâs . . . .                            | — az zabô . . . . .    |
|                                                   | tša sibâs — an . . . .                            | az — zabô . . . . .    |
| afterwards, behind (adv.)                         | tsibas . . . . .                                  | zabô . . . . .         |
| again, moreover, <i>also</i> other                | wâz . . . . .                                     | P. wûz . . . . .       |
| age (years) . . . . .                             | sâl . . . . .                                     | P. sâl . . . . .       |
| aged, old . . . . .                               | khhiâr . . . . .                                  | P. pir . . . . .       |

\* The four words in each dialect opposite each English verb, are the four forms required to be known in order to conjugate the verb, *viz.* the Root or Infinitive Form, the Present, the Past, and the Perfect. Where there are two forms in the second place, the latter of the two is the 3rd Person Singular.



|                               | <i>Wakhi.</i>          | <i>Sarikoli.</i>          |    |
|-------------------------------|------------------------|---------------------------|----|
| to agree, to consent          | kamei-n                | chimb-d-ao                |    |
|                               | { kami-am              | { chomb-am                |    |
|                               | { kimi-t               | {                         |    |
|                               | kamat-am               | chimb-d-am                |    |
|                               | kamatk                 | chimb-dj                  |    |
| agreement, concord,           | asht                   | P. ukht                   | P. |
| to aim                        | karawal dürz-an        | T. W. cho-kând-ao         |    |
|                               |                        | cho-kân-am                |    |
|                               |                        | cho-kând-am               |    |
|                               |                        | cho-kândj                 |    |
| all                           | kökht                  | fük                       |    |
| to allow ( <i>see</i> to put) | latsar-an              | lacheig-ao                |    |
| alone                         | wîr                    | iwj                       |    |
| along (prep.) following a     |                        |                           |    |
| road, river, &c.,             | pas —                  | pas —                     |    |
| also                          |                        | mas                       |    |
| an ambush, a man placed       |                        |                           |    |
| in ambush                     | mâlish tserâk-küzg     | sord-ichoz                |    |
| an ambuscade                  | mâlish                 | sord, mâlikh              |    |
| to lie in ambush              | mâlish tserâk          | sord-ao                   |    |
|                               |                        | sur-am                    |    |
|                               |                        | surd-am                   |    |
|                               |                        | surdj                     |    |
|                               |                        | — darûn                   |    |
| amongst                       |                        | at                        |    |
| and                           |                        |                           |    |
| anger, wrath                  | qâr A. ghâsh           | qâr (qahr)                | A. |
| to be, or become angry        | ghâsh gokh-an, dar qâr | zar set-ao, dar qâr dhâd- |    |
|                               | ding, riz-an           | ao                        |    |
|                               | riz-am                 |                           |    |
|                               | riz-d-am               |                           |    |
|                               | rizetk                 |                           |    |
| ancient, former               | mis-ung                | prôd-enj                  |    |
| animal's droppings            | pôshk                  | bukân                     |    |
| an animal's leg               | lōng                   | P. lang                   | P. |
| a riding animal, a 'monture'  | wulâgh                 | T. wulugh                 | T. |
| to annoy                      | khafâ khâk             | khafâ cheigao             |    |
| annoyed, troubled             | khafâ                  | P. khafâ                  | P. |
| an answer, reply              | jawâb                  | P. juwûb                  | P. |
| an ant                        | mîr-prich              | chumêli                   | T. |
|                               | (king-worm)            |                           |    |
| an antler                     | schao                  | khao                      |    |



|                                         | <i>Wakhi.</i>         | <i>Sarikoli.</i>         |       |
|-----------------------------------------|-----------------------|--------------------------|-------|
| an anvil . . .                          | sandâl . . .          | sandâl . . .             | T.    |
| any one . . .                           | hèch kûi . . .        | hèch chòi . . .          | P. S. |
| to appear . . .                         | sūdhūi-n . . .        | namâid-ao . . .          | P.    |
|                                         | sūdhūy-am . . .       | namây-am . . .           |       |
|                                         | sadhoïd-am . . .      | namâid-am . . .          |       |
|                                         | sūdhūyetk . . .       | namâidj . . .            |       |
| appearance . . .                        | rang . . .            | rang . . .               |       |
| an apple . . .                          | mūr . . .             | mân . . .                |       |
| apricot . . .                           | chiwân . . .          | nôsh . . .               |       |
| arid, dry . . .                         | wesk . . .            | ziakbj . . .             |       |
| to arise . . .                          | giz-n . . .           | indeid-ao . . .          |       |
|                                         | giz-am . . .          | indiz-am . . .           |       |
|                                         | gözd-am . . .         | indaud-am . . .          |       |
|                                         | gözg . . .            | indaudj . . .            |       |
| an armful . . .                         | pâz . . .             | maghaul . . .            |       |
| an armpit . . .                         | kal . . .             | bijel . . .              | P.    |
| arms, weapons . . .                     | asbâb . . .           | P. yerâgh . . .          | T.    |
| an army . . .                           | lūshkâr . . .         | P. lakhkâr . . .         | P.    |
| to arouse, to cause to stand up . . .   | gizūv-n . . .         | indeizând-ao . . .       |       |
|                                         | gizūv-am . . .        | indauzân-am . . .        |       |
|                                         | gizovd-am . . .       | indauzând-am . . .       |       |
|                                         | gizūveth . . .        | indauzândj . . .         |       |
| to arrange, to appoint (to throw) . . . | katâk . . .           |                          |       |
| to arrange in a line . . .              | katâr latsaran . . .  | A. katâr lacheigao . . . | A.    |
| to arrest . . .                         | pichrakhh-n . . .     | pachrakhht-ao . . .      |       |
|                                         | pachrakhh-am . . .    | pachrekhh-am . . .       |       |
|                                         | pachrakhht-am . . .   | pachràkhht-am . . .      |       |
|                                         | pachrakhhetk . . .    | pachrakhhtj . . .        |       |
| <i>also</i> . . .                       | pūtrūm-n . . .        | padromd-ao . . .         |       |
|                                         | pūtrūm-am . . .       | padromb-am . . .         |       |
|                                         | patramd-am . . .      | padrombd-am . . .        |       |
|                                         | pūtrūmetk . . .       | padrombdj . . .          |       |
| to arrive, to reach . . .               | * <i>gat-âk</i> . . . | farebt-ao . . .          |       |
|                                         | <i>gât-am</i> . . .   | farobs-am . . .          |       |
|                                         | <i>gàtt-am</i> . . .  | faribt-am . . .          |       |
|                                         | <i>gatetk</i> . . .   | faribtj . . .            |       |
| an arrow . . .                          |                       | pudh . . .               |       |
| articulation, a joint . . .             | band . . .            | P. band . . .            | P.    |

\* The *g* in italic represents the softer sound of the *ghain* mentioned above (see Sounds), resembling the German *g* in *tage*.





|                                       | <i>Wakhi.</i>       | <i>Sarikoli.</i>                      |       |
|---------------------------------------|---------------------|---------------------------------------|-------|
| an artizan . . . .                    | üstâdh . . . .      | P. ustôdh . . . .                     | P.    |
| ashes, cinders . . . .                | pârg . . . .        | . thier . . . .                       |       |
| to ask, <i>also</i> to have juris-    |                     |                                       |       |
| diction over . . . .                  | pörs-an . . . .     | . pörst-ao . . . .                    |       |
|                                       | pörs-am . . . .     | . pörs-am . . . .                     |       |
|                                       | pörst-am . . . .    | . pörst-am . . . .                    |       |
|                                       | pörsetk . . . .     | . pörstj . . . .                      |       |
| an ass . . . .                        | khur . . . .        | . shër ( <i>from</i> khar P.) . . . . |       |
| a jack-ass . . . .                    | hangî khhur . . . . | T. P. hangî shër . . . .              | T. P. |
| a female ass . . . .                  | mâcha khhur . . . . | . markab shër . . . .                 | A. P. |
| a young ass . . . .                   | kuât . . . .        | . té khâr . . . .                     | P.    |
| a wild ass ( <i>Equus hemionus</i> ), |                     |                                       |       |
| found on Pâmîr . . . .                | ḡulan . . . .       | . ḡulan . . . .                       | T.    |
| an assemblage . . . .                 | ma'reka . . . .     | A. ma'reka . . . .                    | A.    |
| to assemble together, to              |                     |                                       |       |
| be assembled . . . .                  | ghört wâtsn . . . . | . wîkhtj setao . . . .                |       |
| assistance . . . .                    | kûmök . . . .       | T. kûmak . . . .                      | T.    |
| to attain, to touch . . . .           | parva-in . . . .    | . bezeid-ao . . . .                   |       |
|                                       | parvé-am . . . .    | . bizis-am . . . .                    |       |
|                                       | parvet-am . . . .   | . bizeid-am . . . .                   |       |
|                                       | parvetk . . . .     | . bizedhj . . . .                     |       |
| to cause to attain, to hit            | parvev-an . . . .   | . bizeidând-ao . . . .                |       |
| with a missile . . . .                | parvev-am . . . .   | . bizeisân-am . . . .                 |       |
|                                       | parvéâvd-am . . . . | . bizeisând-am . . . .                |       |
|                                       | parvevetk . . . .   | . bizeisânj . . . .                   |       |
| an augury, an omen . . . .            | mutr . . . .        | . fâl . . . .                         | A.    |
| a maternal aunt . . . .               | vôch . . . .        | . vîts . . . .                        |       |
| autumn . . . .                        | tîrmâ . . . .       | P. pidz . . . .                       |       |
| to awake, to wake up . . . .          | agâh wâtsn . . . .  | P. W. agâh setao . . . .              | P. S. |
| an awl . . . .                        | tsârz . . . .       | . tsârz . . . .                       |       |
| an axe, a hatchet . . . .             | tipâr . . . .       | . baldâh . . . .                      | T.    |
| <b>B.</b>                             |                     |                                       |       |
| to babble, also to talk in            | brâm-n . . . .      | . wardhîd-ao . . . .                  |       |
| one's sleep . . . .                   | brâm-am . . . .     | . wardhâu-am . . . .                  |       |
|                                       | brâmd-am . . . .    | . wardhûd-am . . . .                  |       |
|                                       | brâmetk . . . .     | . wardhûdj . . . .                    |       |
| the back or rear of any-              |                     |                                       |       |
| thing . . . .                         | sibâs . . . .       | . zabô . . . .                        |       |
| the back (of a man or                 |                     |                                       |       |
| animal) . . . .                       | part, dâm . . . .   | . chomj, dom . . . .                  |       |
| back, backwards (adv.)                | tar-sibas . . . .   | . tar-zabô . . . .                    |       |



|                             | <i>Wakhi.</i>                        | <i>Sarikoli.</i>       |    |
|-----------------------------|--------------------------------------|------------------------|----|
| on one's back . . .         | sak part . . .                       | chū chomj<br>(on back) |    |
| backwards, à reculons .     | tsibás pudh . . .                    | zabuj padh             |    |
| badness . . .               | shàki . . .                          | ziti                   |    |
| bad, <i>also</i> old . . .  | shàk . . .                           | zit, badh              | P. |
| bad tasting . . .           | trách . . .                          | ? P. trách             |    |
| a bag . . .                 | khaltá . . .                         | khaltá                 | P. |
| baggage, a load . . .       | vür . . .                            | wez                    |    |
| a baggage horse . . .       | yâbu . . .                           | P. yâbu                | P. |
| a baking-pan . . .          | sât . . .                            | sâd                    |    |
| a (playing) ball . . .      | tup . . .                            | pátth                  |    |
| the bank (of a river) .     | lab P. kor . . .                     | lav P. yâr T.          |    |
| bare, naked . . .           | shilakh . . .                        | chalendák              |    |
| bark (of trees) . . .       | shung pist . . .<br><i>wood skin</i> | kabzák                 | T. |
| to bark . . .               | wák-n . . .                          | wák-t-ao               |    |
|                             | wák-am . . .                         | wák-am                 |    |
|                             | wák-t-am . . .                       | wák-t-am               |    |
|                             | wák-ek . . .                         | wák-tj                 |    |
| barley, corn, cattle-feed . | yürk . . .                           | chūshj                 |    |
| a bat . . .                 | shaparak . . .                       | P. shaparak            | P. |
| bay (colour) . . .          | turūgh . . .                         | tūrūgh                 | T. |
| to bay together (as dogs),  | varūi-n . . .                        | varaud-áo              |    |
| to howl . . .               | varüy-am . . .                       | varáu-am               |    |
|                             | varoid-am . . .                      | varūd-am               |    |
|                             | varüyetk . . .                       | varaudj                |    |
| to be . . .                 | hümüi-n . . .                        | vid-áo                 |    |
| I am, &c., . . .            | tei-(am, at, &c.,) . . .             | yost-am                |    |
| I was, &c., . . .           | tu (am, &c.,) . . .                  | vūd-am                 |    |
| having been . . .           | tüwetk . . .                         | vedhj                  |    |
| I may be . . .              | hümi-am . . .                        | váo-(am, &c.,)         |    |
| thou mayest be . . .        | hümüi . . .                          | (see Grammar.)         |    |
| he may be . . .             | hümü-t . . .                         |                        |    |
| we may be . . .             | hümi-an . . .                        |                        |    |
| ye may be . . .             | hümü-it . . .                        |                        |    |
| they may be . . .           | hümi-an . . .                        |                        |    |
| to tell one's beads . . .   | shiráw-an . . .                      | nashrud-ao             |    |
|                             | shiráw-am . . .                      | nashrâw-am             |    |
|                             | shiránd-am . . .                     | nashrud-am             |    |
|                             | shiráwetk . . .                      | nashrudhj              |    |
| a beak . . .                | nūchk . . .                          | nūsk                   |    |





|                                           | <i>Wakhi.</i>                                             | <i>Sarikoli.</i>     |
|-------------------------------------------|-----------------------------------------------------------|----------------------|
| the main beam of a roof                   | wás . . . .                                               | wus                  |
| a bear (brown) . . .                      | nâghordum . . .                                           | yürkh                |
| to bear (a child) . . .                   | yâz-n . . . .                                             | zâd-ao               |
|                                           | yâz-am . . . .                                            | zey-am               |
|                                           | yâzd-am . . . .                                           | zâd-am               |
|                                           | yâzetk . . . .                                            | zâdhj                |
| the Great Bear . . .                      | aft bradarân ( <i>the Seven</i><br><i>Brothers</i> ). . . | aft kunan . . .      |
|                                           | P. W.                                                     | P. S.                |
| a beard . . . .                           | reghish . . . .                                           | bun                  |
| beardless . . . .                         | kâsa . . . .                                              | kesâ . . .           |
| to beat, to pound . . .                   | chuk-n . . . .                                            | châkt-ao             |
|                                           | chuk-am . . . .                                           | châk-am              |
|                                           | chukt-am . . . .                                          | châkt-am             |
|                                           | chuketk . . . .                                           | châktj               |
| because . . . .                           | yao jinib, yem jinib . . .                                | wi ivon, mi ivon     |
| to become . . . .                         | wâts'n . . . .                                            | set-ao               |
|                                           | { wâts-am . . . .                                         | { sô-m               |
|                                           | { wâs-t . . . .                                           | { saud               |
|                                           | vitt-am . . . .                                           | süt-am               |
|                                           | vitk . . . .                                              | sedhj                |
| it becomes (suits) [im-<br>pers.] . . . . | sâz-d . . . .                                             |                      |
| a bed . . . .                             | pîp . . . .                                               | babér                |
| a bee, or a wasp . . .                    | dhôs . . . .                                              |                      |
| a beetle . . . .                          | singurt . . . .                                           | jisk                 |
| before ( <i>time</i> ) . . . .            | dar wakht . . . .                                         | dar wakht . . .      |
|                                           | P. A.                                                     | P. A.                |
|                                           | tar — mis ( <i>nose</i> ), . . .                          | — tar prôd or prut   |
|                                           | — tar mis . . . .                                         |                      |
| before ( <i>place</i> ) . . . .           | — prüt . . . .                                            | — prôd               |
| a beggar, a petitioner . .                | chilgâk-küzg . . . .                                      | tâlibt-ichôz         |
| beginning . . . .                         | pursam . . . .                                            |                      |
| behind, after (adv.) . .                  | tsibás . . . .                                            | zabô                 |
| behind (p.p.) . . . .                     | tse ——— sibás-an . . .                                    | — az zabô            |
| the being or existing . .                 | hümüin . . . .                                            | vidi                 |
| a bell . . . .                            | zul . . . .                                               | gûl                  |
| below . . . .                             | purdast, sa ——— past-an . .                               | — pa bun, — az babér |
| beloved or loveable . .                   | bâ tserâk-chok . . . .                                    | bâ cheig-asuk        |
| to bellow . . . .                         | sak-wâghn wâtsn'. . . .                                   | chü wâghd setao      |
| belly, stomach . . . .                    | wânj, dur . . . .                                         | kech                 |
| to bend . . . .                           | khham ding. . . .                                         | cheng dhâdao         |
|                                           | P. W.                                                     | kham dhâdao          |





|                                              | <i>Wakhi.</i>       | <i>Sarikoli.</i>                                             |       |
|----------------------------------------------|---------------------|--------------------------------------------------------------|-------|
| to besiege, to enclose . . .                 | kábál ding . . .    | ḡábál dhâdao                                                 |       |
| to bestow, to grant . . .                    | nung ding . . .     | P. nûm dhâdao                                                | A. S. |
| betrothal . . .                              | kh'astaga           |                                                              |       |
| between . . .                                | miyáná              |                                                              |       |
| beyond (p.p.) . . .                          | tša — an dhîr . . . | az — dhâr                                                    |       |
| beyond (adv.) . . .                          | yâ sâr . . .        | tar wi sâr                                                   |       |
| the bile . . .                               | talkhâh . . .       | P. trâch                                                     |       |
| to bind . . .                                | vand-âk . . .       | vist-ao                                                      |       |
|                                              | vând-am . . .       | vind-am                                                      |       |
|                                              | vâst-am . . .       | vüst-am                                                      |       |
|                                              | vandetk . . .       | vüstj                                                        |       |
| a binding or edging . . .                    | ziek . . .          | zéak                                                         | T.    |
| a birch tree . . .                           | furz . . .          | kaying                                                       | T.    |
| birch bark . . .                             | furz pist . . .     | kaying past                                                  |       |
| a bird . . .                                 | parinda . . .       | P. ḡush                                                      | T.    |
| a biscuit . . .                              | pütâḡ . . .         | taḡich                                                       |       |
| a bit (horse's) . . .                        | jaoji . . .         | jaojao                                                       |       |
| to bite or sting . . .                       | nosh ding . . .     | P. W. nekh dhâdao                                            | P. S. |
| to bite . . .                                | dündük ding . . .   | dhandân dhâdao                                               |       |
| bitter . . .                                 | talkhh . . .        | tsekh                                                        |       |
| the black on the bottom<br>of a kettle . . . | rizm . . .          | rizm                                                         |       |
| black . . .                                  | schû . . .          | P. târ                                                       | P.    |
| a blacksmith . . .                           | âin-gar . . .       | âin-gar                                                      |       |
| a blanket, a body cover-<br>ing . . .        | kampál . . .        | ? P. bawéin                                                  |       |
| a horse blanket . . .                        | jil . . .           | P. jal                                                       | P.    |
| a cold blast . . .                           | sûz . . .           | sâuz (lit. 'a flame,'<br>from the burning<br>effect of cold) |       |
| to bleat . . .                               | wâgh-an . . .       | wâghd-ao                                                     |       |
| blessing (subst.) . . .                      | küt . . .           | T. küt                                                       | T.    |
| blind . . .                                  | kur . . .           | T. kaur                                                      |       |
| blood . . .                                  | wukhan . . .        | wakhhîn                                                      |       |
| to blow . . .                                | puf tserâk . . .    | puf cheigao                                                  |       |
| blue . . .                                   | savz . . .          | P. khoin, sâvz                                               | P.    |
| blunt . . .                                  | muḡ . . .           | méaḡ                                                         |       |
| to blush . . .                               | sökr wâtsn . . .    | rüsht set-ao                                                 |       |
| a boat . . .                                 | kishti . . .        | P. kamâh                                                     | T.    |
| to boil . . .                                | yâksh-n . . .       | wirevd-ao                                                    |       |
|                                              | yâksh-am . . .      | wârav-am                                                     |       |





|                                                                | <i>Wakhi.</i>      | <i>Sarikoli.</i> |       |
|----------------------------------------------------------------|--------------------|------------------|-------|
|                                                                | yâksht-am . . .    | wirevd-am        |       |
|                                                                | yakshetk . . .     | wirevdj          |       |
| a bone . . .                                                   | yaich . . .        | ustkhân          | P.    |
| boot (given in addition<br>to an article exchang-<br>ed) . . . | bâlâmad . . .      | âstag            | T.    |
| rough boots of untan-<br>ned leather . . .                     | shûshk . . .       | pekhk            |       |
| the bosom . . .                                                | bap . . .          | tej              |       |
| both . . .                                                     | har kifch . . .    | virt             |       |
| bottom . . .                                                   |                    | bun              | P.    |
| a bow (to shoot with) .                                        | kamânak . . .      | tsan             |       |
|                                                                | tir dast . . .     |                  | P.    |
| a wooden bowl . . .                                            | kubun . . .        | totheh           |       |
| a box . . .                                                    | sunduk . . .       | sandiek          | P.    |
| a boy . . .                                                    |                    | gadhâ            |       |
| bran . . .                                                     | safk . . .         | sabast           | P.    |
| a branch . . .                                                 | sholkhh . . .      | shokhh           | P.    |
| to brand . . .                                                 | dâgh katâk . . .   | dugh dhâdao      | P. S. |
| the brain . . .                                                | maghz . . .        | moghz            | P.    |
| brass . . .                                                    | khhâlâh . . .      | khholâh          | P.    |
| brave, courageous . .                                          | bâtûr . . .        | bâtûr (bahadur)  | A.    |
| bread . . .                                                    | khoch . . .        | khpik            |       |
| a thin cake of bread .                                         | fitir . . .        | chapâti          | T.    |
| breadth, width . . .                                           | bâr . . .          | bâr              | P.    |
| to break (intr.) . . .                                         | waḡ-n . . .        | waḡt-ao          |       |
|                                                                | waḡ-am . . .       | waḡ-am           |       |
|                                                                | waḡt-am . . .      | waḡt-am          |       |
|                                                                | waḡetḡ . . .       | waḡtj            |       |
| to break [intr.], to be-<br>come broken . . .                  | schkôdh-an wâtsn . | varakhtj setao   |       |
|                                                                | also schkôdh-an    |                  |       |
|                                                                | schkûr-am          |                  |       |
|                                                                | schkônd-am         |                  |       |
|                                                                | schkông            |                  |       |
| to break (tr.) . . .                                           | schkôdh-an . . .   | varâkht-ao       |       |
|                                                                | schkônd-am . . .   | vareig-am        |       |
|                                                                | schkôtt-am . . .   | varâkht-am       |       |
|                                                                | schkôtk . . .      | varâkhtj         |       |
| to break in (a horse, &c.)                                     | borgi ding . . .   | burgi dhâd-ao    |       |





|                            | <i>Wakhi.</i>         | <i>Sarikoli.</i>  |    |
|----------------------------|-----------------------|-------------------|----|
| to break (of a rope, &c.,) |                       |                   |    |
| [intr.] . . . .            | rasüdh-n . . . .      | zdàkht-ao         |    |
|                            | rasedh-am . . . .     | zdeig-am          |    |
|                            | rasen-am . . . .      | zdàkht-am         |    |
|                            | raseng . . . .        | zdàkhtj           |    |
| to break (a rope or        |                       |                   |    |
| thread) [tr.] . .          | rasedhüv-n . . . .    | zdardhànd-ao      |    |
|                            | rasedhav-am . . . .   | &c.               |    |
|                            | rasedhovd-am          |                   |    |
|                            | rasedhüvetk           |                   |    |
| the breast, the chest      | püz . . . .           | poz               |    |
| breath . . . .             | dam . . . .           | dam               | P. |
| a piece of brick . .       | shölg . . . .         | khalg             |    |
| a bridge . . . .           | skord . . . .         | yéid              |    |
| a bridle . . . .           | yikhân . . . .        | vidhân            |    |
| to bring . . . .           | wüzüm-an . . . .      | veig-ao           |    |
|                            | wüzüm-am . . . .      | { vor-am          |    |
|                            |                       | { vir-d           |    |
|                            | wazâmd-am . . . .     | vaug-am           |    |
|                            | wüzümetk . . . .      | vaugj             |    |
| to bring or take in, to    |                       |                   |    |
| cause to enter, to in-     |                       |                   |    |
| troduce . . . .            | chirmüv-n . . . .     | duwâst-ao         |    |
| to bring to mind, to re-   |                       |                   |    |
| collect . . . .            | tar yâd wüzüm-n . .   | tar yôd veig-ao   |    |
| broad, expanded . .        | kshâdh . . . .        | P. kkhudh         | P. |
| to bring up, to nurture    | dego-an               | (sh)              |    |
|                            | deg-am                |                   |    |
|                            | degd-am               |                   |    |
|                            | degatk                |                   |    |
| broken . . . .             | schkōng               |                   |    |
| which is or has been       |                       |                   |    |
| broken . . . .             | schkōngung . . . .    | varàkhtj sedhj    |    |
| which or who has broken    | schkōtgung . . . .    | varàkhtj-enj      |    |
| broken ground . . .        | wuch past . . . .     | W. P. karsi bilik |    |
|                            | (high low) . . . .    | [low high]        |    |
| a brother . . . .          | vrüt, lal (?) . . . . | vrôd              |    |
| related as brothers .      | vrüt-in . . . .       | vrador            |    |
| brow, forehead . .         | ruk                   |                   |    |
| to brush against, to im-   |                       |                   |    |
| pinge . . . .              | shtràkh-n . . . .     | turft-ao          |    |
|                            | shtràkh-am . . . .    | turf-am           |    |



|                               | <i>Wakhi.</i>                   | <i>Sarikoli.</i>   |      |
|-------------------------------|---------------------------------|--------------------|------|
|                               | shtràkht-am . . .               | turft-am           |      |
|                               | shtràkhetk . . .                | turftj             |      |
| a buck-goat . . .             | ghurgàu tugh . . .              | büch               |      |
| a buckle . . .                | alkà . . .                      | alkà               | P.   |
| a bull . . .                  | chàt druksh . . .               | chàt khièj         |      |
|                               | ghurgào . . .                   | wièrz              |      |
| a bullet . . .                | wutch . . .                     | poth               |      |
| a bullock, an ox . . .        | druksh . . .                    | khièj              |      |
| a bundle . . .                | bâghehâh . . .                  | T. bukhehâh        | T.   |
| to burn (tr.), to set fire to | thiüv-n . . .                   | thawând-ao         |      |
|                               | thiüv-am . . .                  | thawân-am          |      |
|                               | thâwovd-am . . .                | thawând-am         |      |
|                               | thiüvetk . . .                  | thawândj           |      |
| to burn (intr.), to be burnt  | thau-âk . . .                   | thid-ao            |      |
|                               | thau-am . . .                   | thau-am            |      |
|                               | thett-am . . .                  | thüd-am            |      |
|                               | thetk . . .                     | thedhj             |      |
| to burst [intr.], to be       |                                 |                    |      |
| burst . . .                   | zübedh-n . . .                  | parist-ao          | ? P. |
|                               | zübedh-am . . .                 | pàràth-am          |      |
|                               | zübön-am . . .                  | parüst-am          |      |
|                               | züböng . . .                    | parüstj            |      |
| to burst [tr.] . . .          | zübütüv-n . . .                 | parind-ao .        |      |
|                               | zübüt-am . . .                  | parin-am .         |      |
|                               | zübott-am . . .                 | parind-am          |      |
|                               | zübüt . . .                     | parindj            |      |
| to bury . . .                 | khkhâk khâk . . .               | ba khkhâk cheig-ao | P.   |
| a thorn bush, a bramble .     | chirîr . . .                    | khâr               | P.   |
| a bush-harrow, a rake .       | namurzg . . .                   | namüzg             |      |
| business, work . . .          | yark . . .                      | chèr               |      |
| to butt . . .                 | ding [ <i>to strike</i> ] . . . | tàkht-ao           |      |
|                               |                                 | tàrdh-am           |      |
|                               |                                 | tàkht-am .         |      |
|                               |                                 | tàkhtj .           |      |
| butter . . .                  | rughn . . .                     | P. raun            | P.   |
| a butterfly . . .             | pilpilâk . . .                  | köpali             | T.   |
| a button . . .                | tügmâ, kâwa . . .               | tügmâ              | T.   |
| to buy . . .                  | khharid tserâk . . .            | khharid ebeigao    |      |
| by, by means of, with .       | ———— mōshōn . . .               | ———— its           |      |





## Wakhi.

## Sarikoli.

## C.

|                                                                                                      |                                                                   |                     |       |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------|-------|
| a thin cake of bread .                                                                               | fitir . . . . .                                                   | chapâti             | T.    |
| a calf . . . . .                                                                                     | wushk . . . . .                                                   | wishk               |       |
| to call, to summon, to<br>make proclamation .                                                        | kiw tser-âk . . . . .<br>tsâr-am<br>tsârt-am<br>tsaretk . . . . . | kiw cheigao         |       |
| a camel [two-humped] .                                                                               | ushtûr . . . . .                                                  | P. khtûr            | P.    |
| a young camel . . . . .                                                                              | ûshtûr zaman . . . . .                                            | tâilâk              |       |
| a [camel's] hump . . . . .                                                                           | kap . . . . .                                                     | kiep                |       |
| camp, quarters, <i>also</i> a<br>household . . . . .                                                 | kosh . . . . .                                                    | T. kesh, kushum     | T.    |
| a canal, water-course .                                                                              | charm, wâdh . . . . .                                             | wâdh, ûstang        | T.    |
| a candle [made by wind-<br>ing cotton cloth round<br>a central core of fat<br>surrounding a stick] . | sham . . . . .                                                    | shâm                |       |
| a fur cap . . . . .                                                                                  | tumâgh . . . . .                                                  | tûmâgh              |       |
| to take care of . . . . .                                                                            | nigâh tserâk . . . . .                                            | P. W. nigâh cheigao | P. S. |
| a carrier of merchandize<br>for hire . . . . .                                                       | kirâ-kash . . . . .                                               | P. kirâ-kash        | P.    |
| carriage . . . . .                                                                                   | gündâs . . . . .                                                  | târp                | T.    |
| a cat . . . . .                                                                                      | pish . . . . .                                                    | pish                |       |
| cattle . . . . .                                                                                     | mâl (= <i>property</i> ). . . . .                                 | mûl                 | P.    |
| horned cattle . . . . .                                                                              | chât . . . . .                                                    | chât                |       |
| a cave . . . . .                                                                                     | bâi . . . . .                                                     | P. bûi, garma       |       |
| a chain . . . . .                                                                                    | zanzîr . . . . .                                                  | P. zanzéir          | P.    |
| to change [in appear-<br>ance] [tr.] . . . . .                                                       | yan rang khâk . . . . .                                           | yan rang cheigao    |       |
| to be changed . . . . .                                                                              | yan rang wâtsn . . . . .                                          | yan rang setao      |       |
| a charge [of cavalry] .                                                                              | sak-göfsn . . . . .                                               | chû-zokht           |       |
| cheap . . . . .                                                                                      | arzân . . . . .                                                   | P. arzân            | P.    |
| the cheek . . . . .                                                                                  | lunj . . . . .                                                    | nûrj                |       |
| cheese . . . . .                                                                                     | panîr . . . . .                                                   | P. panèr            | P.    |
| chestnut [colour] . . . . .                                                                          | jeiran . . . . .                                                  | T. jéirân           | T.    |
| to chew the cud . . . . .                                                                            | ramôt yit-n ( <i>see</i> 'to eat')                                | wakbkièr khheig-ao  |       |
| a chicken [young] . . . . .                                                                          | kilich . . . . .                                                  | chujâ               | T.    |
| a child, an infant . . . . .                                                                         | zâh, zaman . . . . .                                              | bachâh P., bala     | T.    |
| child-bearing labour . . . . .                                                                       | zichâ . . . . .                                                   | zichâ               |       |
| a chimney . . . . .                                                                                  | ritsn . . . . .                                                   | P. rezn             | P.    |
|                                                                                                      | mori . . . . .                                                    | ? T. meri           | ? P.  |



|                                                 | <i>Wakhi.</i> |      | <i>Sarikoli.</i> |       |
|-------------------------------------------------|---------------|------|------------------|-------|
| to chirp, to twitter                            | chir-an       | ? T. | chird-ao         |       |
|                                                 | chir-am       |      | chir-am          |       |
|                                                 | chird-am      |      | chird-am         |       |
|                                                 | chiretk       |      | chirdj           |       |
| to choose out, to select                        | yawer-n       |      | yarur cheig-ao   | T. S. |
|                                                 | yawer-am      |      |                  |       |
|                                                 | yawerd-am     |      |                  |       |
|                                                 | yaweretk      |      |                  |       |
| to chop                                         | rasüdh-n      |      | khehakht-ao      |       |
|                                                 | rasedh-am     |      | kheheig-am       |       |
|                                                 | rasen-am      |      | khehakht-am      |       |
|                                                 | raseng        |      | khehakhtj        |       |
| a chopping-board                                | dösh shung    |      | dösh khüng       |       |
| a chough                                        | swäts         |      | ghogh            |       |
| cinders, ashes                                  | parg          |      | thier            |       |
| a circuit, a circumference                      | pslab         |      | sän dawänd       |       |
|                                                 |               |      | (edge circle)    |       |
| circular                                        | put           |      | pet              |       |
| a claw, a talon                                 | chang         | P.   | changäl          | P.    |
| clay, mud                                       | khhet         |      | ghät             |       |
| fine clay                                       | saghaz        | T.   | saghâz           | T.    |
| a cliff                                         | koh           | P.   | teij             |       |
| an overhanging cliff or a<br>vertical precipice | haud          |      | chapāk           |       |
| a cloak, clothes                                | böt           |      | lël              |       |
| to close one's eyes, mouth,<br>&c.              | bärs-an       |      | baghmîd-ao       |       |
|                                                 | bärs-am       |      | baghmez-am       |       |
|                                                 | bärst-am      |      | baghmûg-am       |       |
|                                                 | bärsetk       |      | baghmûgj         |       |
| cotton cloth                                    | chikman       | T.   | galèm            | ? P.  |
| coarse cotton cloth                             | chil          |      | tsaul            |       |
| bleached coarse cotton<br>cloth                 | kinei         |      | lël              |       |
| to clothe (another person)                      | pametsiv-an   |      | pamedzând-ao     |       |
| a cloud, a fog                                  | mûr           |      | varm             |       |
| cognizance, perception                          | darak         | P.   | darak            | P.    |
| cold (adj.)                                     | sür           | ? P. | ish              |       |
| a cold                                          | kokh          |      | yong             |       |



|                            | <i>Wakhi.</i>      |       | <i>Sarikoli.</i> |    |
|----------------------------|--------------------|-------|------------------|----|
| to become cold . . . .     | wasèr-n . . . .    |       | patsig-ao        |    |
|                            | wasèr-am . . . .   |       | patsi-am         |    |
|                            | wasèrt-am . . . .  |       | patsüg-am        |    |
|                            | waseretk . . . .   |       | patsügj          |    |
| a cold blast . . . .       | sûz . . . .        |       | sauz             |    |
| coldness, cold (subst.) .  | sûri . . . .       |       | îshi             |    |
| a collar [of a garment] .  | gharagh . . . .    |       | zerej            |    |
| to collect, to bring toge- | gürt-an . . . .    |       | wikht-ao         |    |
| ther . . . .               | gürt-am . . . .    |       | wikh-am          |    |
|                            | gortt-am . . . .   |       | wikht-am         |    |
|                            | gürtetk . . . .    |       | wikhtj           |    |
| colour, dye . . . .        | rang . . . .       | P.    | rang             | P. |
| light-coloured [of eyes] . | chaqir . . . .     |       | chaqar           |    |
| a colt . . . .             | tâi . . . .        | T.    | tâi              | T. |
| a comb . . . .             | napösan . . . .    |       | wakhèrj          |    |
| to come . . . .            | wazé-in . . . .    |       | yet-ao           |    |
|                            | { wazi-am . . . .  |       | yâdh-am          |    |
|                            | { wizat . . . .    |       | yât-am           |    |
|                            | wazd-am . . . .    |       | ithj             |    |
|                            | wazg . . . .       |       |                  |    |
| to cause to come [a liv-   | wüzüm-n . . . .    |       | vayând-ao        |    |
| ing creature] . . . .      | wüzüm-am . . . .   |       | vayân-am         |    |
|                            | wazâmd-am . . . .  |       | vayând-am        |    |
|                            | wüzümetk . . . .   |       | vayândj          |    |
| to come out, to go out .   | niuz-n . . . .     |       | nakhtig-ao       |    |
| to command, to order .     | raméi-n . . . .    |       | râmâd-ao         |    |
|                            | { rami-am . . . .  |       | { rami-am        |    |
|                            | { rimi-t . . . .   |       | { râmâ-id        |    |
|                            | ramatt-am . . . .  |       | ramod-am         |    |
|                            | rametk . . . .     |       | ramodhj          |    |
| a companion on the road    | am-râh . . . .     | P.    | am-râh           | P. |
| to compensate . . . .      | tâwan rand-âk .    | P. W. | tûlan dbâdao     |    |
| complete, entire . . . .   | drüst . . . .      |       | pütün            | T. |
| to compound, to mix .      | shind-ak . . . .   |       | khirkt-ao        |    |
|                            | shand-am . . . .   |       | khirkh-am        |    |
|                            | shandid-am . . . . |       | khirkht-am       |    |
|                            | shondetk . . . .   |       | kherkhtj         |    |
| concord, agreement .       | âsht . . . .       | P.    | ukht             | P. |
| to consent [agree] .       | kaméi-n . . . .    |       | chimd-ao         |    |
| to construct, to make .    | sâz khâk . . . .   | P.    | suz cheigao      | P. |
| contrariness, disobedi-    | mastrakhhi . . . . |       | kaishi           | T. |
| ence . . . .               |                    |       |                  |    |





|                                                 | <i>Wakhí.</i> |       | <i>Sariḱolí.</i>     |       |
|-------------------------------------------------|---------------|-------|----------------------|-------|
| contravening, contrary .                        | mastrakhh     | .     | ḱaish                |       |
| to converse .                                   | ḱsa khānāk    | A. W. | gap cheig-ao         | P. S. |
| to cook, <i>also</i> to ripen .                 | pōch-an       | .     | pizd-ao              |       |
|                                                 | pōch-am       | .     | { pez-am             |       |
|                                                 |               | .     | { pās-t              |       |
|                                                 | pōsht-am      | .     | pekhht-am            |       |
|                                                 | pōchetk       | .     | pekhhtj              |       |
| to cause to cook .                              | patsüv-n      | .     | pekhht rāmād-ao, &c. |       |
|                                                 | patsüv-am     | .     | (to command, q. v.)  |       |
|                                                 | patsovd-am    | .     |                      |       |
|                                                 | patsüvetk     | .     |                      |       |
| cooked rations .                                | sheilân       | P.    | sheilân              | P.    |
| a cooking pot, a caul-                          |               |       |                      |       |
| dron .                                          | dig           | P.    | deg                  | P.    |
| cool .                                          | soz           | .     | salkin               | T.    |
| to cool [intr.] .                               | wasern        | .     | patsig-ao            |       |
|                                                 | waser-am      | .     | patsor-am            |       |
|                                                 | wasert-am     | .     | patsug-am            |       |
|                                                 | waseretk      | .     | patsugj              |       |
| to cool [tr.] .                                 | wasirüv-n     | .     | pâtserând-ao         |       |
|                                                 | wasirüv-am    | .     | pâtserân-am          |       |
|                                                 | wasirovd-am   | .     | pâtserând-am         |       |
|                                                 | wasirüvetk    | .     | patserândj           |       |
| copper .                                        | mis           | P.    | mis                  | P.    |
| coral .                                         | satk          | .     | makhhorj             |       |
| Indian-corn [not grown<br>in W. and S.] .       | ḱonāk         | T.    | ḱonāk                | T.    |
| reaped corn, heaped up<br>ready for threshing . | chiramn       | .     | shürüm               |       |
| a corner [of any square<br>space] .             | pâlch         | .     | bülung               | T.    |
| a corpse, a dead man .                          | mardhâh       | P.    | murdhâh              | P.    |
| a cough .                                       | kokhh         | .     | kekhh                |       |
| to cough up phlegm .                            | akhh khāk     | .     | akhh cheigao         |       |
| counsel, advice .                               | salâh         | A.    | salâh                | A.    |
| to count .                                      | asâb tserāk   | A. W. | asûb cheigao         | A. S. |
| countenance .                                   | pets          | .     | rüi                  | P.    |
| a counterpane .                                 | kampal        | .     | khavüng              |       |
|                                                 | kürpa         | T.    | kurpa                | T.    |
| a country, "patrie" .                           | diâr          | P.    | diûr                 | P.    |
| courageous, brave .                             | bâtür         | A.    | bâtür                | A.    |





|                                                                       | <i>Wakhi.</i>                | <i>Sarikoli.</i>    |
|-----------------------------------------------------------------------|------------------------------|---------------------|
| to cover, to close . . .                                              | gin . . . . .                | bawid-ao            |
|                                                                       | gaw-am, git . . . .          | bawei-am            |
|                                                                       | gött-am . . . . .            | bawid-am            |
|                                                                       | götk . . . . .               | bawedhj             |
| to cover the head (by<br>tying a cloth round<br>it; said of a woman). | sâr zwâin . . . . .          | sârmalâ dhâd-ao     |
| a cow . . . . .                                                       | chât ghû . . . . .           | chât zau            |
| a cradle . . . . .                                                    | gaura (gahwâra P.) . .       | prâkht              |
| a crane . . . . .                                                     | turnai . . . . .             | turnâi              |
| cream . . . . .                                                       | marik . . . . .              | mareb               |
| to create . . . . .                                                   | âfrîd khâk . . . . .         | âfrîd cheigao P. S. |
| to creep, to crawl . . .                                              | gazâ ding . . . . .          | gazâ dhâdao         |
| a crook-back . . . . .                                                | put-dâm . . . . .            | duk                 |
| crooked . . . . .                                                     | kard . . . . .               | cherd               |
| a crop . . . . .                                                      | kûshtah . . . . .            | chermi P.           |
| to cross (a Pass), to go<br>over or round, to dance                   | gir-an . . . . .             | gherd-ao            |
|                                                                       | gir-am . . . . .             | ghirs-am            |
|                                                                       | gird-am . . . . .            | gherd-am            |
|                                                                       | giretk . . . . .             | gherdj              |
| a crow . . . . .                                                      | karghâ . . . . .             | karghâ T.           |
| to crumble . . . . .                                                  | frîl-n . . . . .             | warfakht-ao         |
|                                                                       | frîl-am . . . . .            | warfareig-am        |
|                                                                       | frîld-am . . . . .           | warfakht-am         |
|                                                                       | frîletk . . . . .            | warfakhtj           |
| to cry (as animals or<br>children) . . . . .                          | nâla tserâk . . . . .        | chîrâs cheig-ao     |
| a cuckoo . . . . .                                                    | (none in <i>Wakhân</i> ) . . | kakkûk T.           |
| cultivable . . . . .                                                  | kûrn-asuk . . . . .          | chârd-asuk          |
| to cultivate . . . . .                                                | kûr-n . . . . .              | chârd-ao            |
|                                                                       | kûr-am . . . . .             | châr-am             |
|                                                                       | kösht-am . . . . .           | chârd-am            |
|                                                                       | köshk . . . . .              | chârdj              |
| cultivated . . . . .                                                  | köshk-öng . . . . .          | chermi              |
| cultivation . . . . .                                                 | kûrn . . . . .               | chârd               |
| a cup . . . . .                                                       | pîl, chini . . . . .         | chinak, chini       |
| curds . . . . .                                                       | pâi . . . . .                | pòi                 |
| a curse . . . . .                                                     | andiwat . . . . .            | zaugh               |
| a custom, institution .                                               | ḡaidah . . . . .             | yusun A. T.         |
| a cut, a notch . . . . .                                              | rasang-üng . . . . .         | khehakhtj-enj       |



|                          | <i>Wakhi.</i>                                 | <i>Sarikoli.</i>                                  |
|--------------------------|-----------------------------------------------|---------------------------------------------------|
| to cut, to cut off . . . | rasüdh-n . . .                                | khehakht-ao                                       |
|                          | rasüdh-am, rasatht . . .                      | { kheheig-am<br>khehakht-am                       |
|                          | rasan-am . . .                                | khehakhtj                                         |
|                          | rasang . . .                                  |                                                   |
| to cut, to whittle . . . | tüsh-an . . .                                 | tukht-ao                                          |
|                          | tüsh-am . . .                                 | tûkh-am                                           |
|                          | tosht-am . . .                                | tûkht-am                                          |
|                          | tüshetk . . .                                 | tûkhtj                                            |
| to cut out . . .         | rasüdhn dürzn ( <i>to cut to take</i> )       | khehakht-zokhtao                                  |
|                          | rasüdham-dürzam, ( <i>I cut I take</i> ) &c., | kheheig-am zôz-am, &c.                            |
| to cut with an axe . . . | trâsh ding . . . P. W.                        | chapôrd-ao<br>chapôr-am<br>chapôrd-am<br>chapôrdj |
| to cut into strips . . . | khash-âk . . .                                | tizd-ao                                           |
|                          | khâsh-am . . .                                | tâz-am                                            |
|                          | khâsht-am . . .                               | tizd-am                                           |
|                          | khashetk . . .                                | tizdj                                             |

The Tartar year Cycle named after 12 animals is used.

Cypress (*cupressus toru-*

*losa*) (called pencil cedar) yârz . . . imbârs

#### D.

|                                               |                     |                 |
|-----------------------------------------------|---------------------|-----------------|
| daily, of a day . . .                         | rwâr-üng . . .      | mâthonj         |
| to dance attendance, to pay one's court . . . | shinjual khâk . . . | valvakh cheigao |
| dangling . . .                                | ravindak . . .      | ravindâk        |
| darkness, dark . . .                          | târik . . .         | târik P.        |
| a daughter . . .                              | dhagd . . .         | radzen          |
| a daughter-in-law . . .                       | stakh . . .         | zanâl           |
| dawn . . .                                    | rûkhhn . . . P.     | yâul            |
| to dawn . . .                                 | rûkhhn wâts-n . . . | yâul dhâd-ao    |
| a day . . .                                   | rwâr . . .          | mâth            |
| day-time . . .                                | rwâr . . .          | mâthân          |
| deaf . . .                                    | kâr . . . P.        | chûn            |
| dealings (lit. give and take) . . .           | dürzn radhâ-n . . . | dhâd zokht      |





|                                                                                    | <i>Wakhi.</i>                                                                                                          |       | <i>Sarikoli.</i>                                                                                                         |       |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------|-------|
| dearness, scarcity . . .                                                           | kimati . . . . .                                                                                                       |       | kimati . . . . .                                                                                                         | A.    |
| death . . . . .                                                                    | màrg . . . . .                                                                                                         |       | màrg . . . . .                                                                                                           | P.    |
| a débâcle of soil, rock, &c.<br>brought into the stream<br>by a flood of rain, &c. | shot . . . . .                                                                                                         |       | kara kokum . . . . .                                                                                                     |       |
| a deception, a deceit . . .                                                        | tarzik, durogh . . . . .                                                                                               | P.    | tarziv, fànd . . . . .                                                                                                   | P.    |
| a decree, an edict . . . .                                                         | ük m . . . . .                                                                                                         | A.    | ük m . . . . .                                                                                                           | A.    |
| a deer, a general term for<br>all horned wild animals                              |                                                                                                                        |       | ghüej . . . . .                                                                                                          |       |
| deficiency . . . . .                                                               | dzàki . . . . .                                                                                                        |       | dzüli . . . . .                                                                                                          |       |
| delay . . . . .                                                                    |                                                                                                                        |       | hayal . . . . .                                                                                                          | A.    |
| delicate, tender . . . . .                                                         | senâf . . . . .                                                                                                        |       | nazük . . . . .                                                                                                          | A.    |
| a demon . . . . .                                                                  | liw . . . . .                                                                                                          |       | dhéw . . . . .                                                                                                           | P.    |
| to dent, to compress<br>forcibly . . . . .                                         | nadhefsüv-n . . . . .<br>nadhefsüv-am . . . . .<br>nadhefsovd-am . . . . .<br>nadhefsüvetk . . . . .                   |       | nadhambând-ao, &c. . . . .                                                                                               |       |
| dented (of a kettle, &c.)<br>to be dented, to be com-<br>pressed . . . . .         | nadhafk-üng . . . . .<br><br>nadhefs-an . . . . .<br>nadhefs-am . . . . .<br>nadhavd-am . . . . .<br>nadhafk . . . . . |       | nadhevdj-enj . . . . .<br><br>nadhevd-ao . . . . .<br>nadhivs-am . . . . .<br>nadhevd-am . . . . .<br>nadhevdj . . . . . |       |
| to deny . . . . .                                                                  | munkir wâtsn . . . . .                                                                                                 |       | munkir setao . . . . .                                                                                                   | A. S. |
| to depart, to start . . . .                                                        | rawân wâtsn . . . . .                                                                                                  | P. W. | rawân setao . . . . .                                                                                                    | P. S. |
| deprived of, without . . .                                                         | bi ——— . . . . .                                                                                                       |       | be ——— . . . . .                                                                                                         |       |
| to descend . . . . .                                                               | kham-âk . . . . .<br>khâm-am . . . . .<br>khâmd-am . . . . .<br>khametk . . . . .                                      |       | khâvd-ao . . . . .<br>khâvs-am . . . . .<br>khâvd-am . . . . .<br>khâvdj . . . . .                                       |       |
| a desert . . . . .                                                                 | dasht P., chûl . . . . .                                                                                               | T.    | dokht P. chaul . . . . .                                                                                                 | T.    |
| a desire . . . . .                                                                 | talab . . . . .                                                                                                        |       | talab . . . . .                                                                                                          | A.    |
| to desire . . . . .                                                                | chilg-âk . . . . .<br>châlg-am . . . . .<br>châld-am . . . . .<br>chilgetk . . . . .                                   |       | tâlibt-ao . . . . .<br>tâlâb-am . . . . .<br>tâlibt-am . . . . .<br>tâlibtj . . . . .                                    |       |
| a "devil," a whirlwind                                                             | liw damâ . . . . .                                                                                                     |       | dhéw balamût . . . . .                                                                                                   |       |
| dew, also a white frost                                                            | schak . . . . .                                                                                                        |       | khok . . . . .                                                                                                           |       |
| difficult, troublesome . .                                                         | kilâh . . . . .                                                                                                        |       | kilâh . . . . .                                                                                                          |       |
| with difficulty, hardly . .                                                        | azâr ghilâh . . . . .                                                                                                  | P. W. | azûr ghilâh . . . . .                                                                                                    | P. S. |





|                                              | <i>Wakhi.</i>                                        | <i>Sarikoli.</i>          |
|----------------------------------------------|------------------------------------------------------|---------------------------|
| to die . . . . .                             | mara-in . . . . .                                    | marg-ao                   |
|                                              | mari-am, mîrit . . . . .                             | mîr-am, merd              |
|                                              | mörtt-am . . . . .                                   | maug-am                   |
|                                              | mörtk . . . . .                                      | maugj                     |
| to dig, to excavate . . . . .                | parköl-n . . . . .                                   | kaud-ao                   |
|                                              | parköl-am . . . . .                                  | kâu-am                    |
|                                              | parköld-am . . . . .                                 | kaud-am                   |
|                                              | parköletk . . . . .                                  | kaudj                     |
| to digest . . . . .                          | 'azam khâk . . . . .                                 | 'azam cheigao P.          |
| to dip (tr.) . . . . .                       | ghot ding . . . . .                                  | P. W. ghût dhâd-ao P. S.  |
| to dip oneself, to plunge                    | ghot yît-n (lit. <i>to eat a dipping</i> ) . . . . . | P. W. ghût kheig-ao P. S. |
| direction . . . . .                          | tûsh T., ganâ . . . . .                              | tûsh T.                   |
| in what direction ? . . . . .                | tar kum ganâ ? . . . . .                             | tar kê ganâ ?             |
| dirty . . . . .                              | chirkin . . . . .                                    | T. ghazd                  |
|                                              | rim . . . . .                                        | kheidh                    |
| a dish . . . . .                             | kubûn . . . . .                                      | tothch                    |
| disobedience, contrari-<br>ness . . . . .    | mastrakh . . . . .                                   | kâishi T.                 |
| to disperse, to scatter<br>[intr.] . . . . . | takhhirm wâtsn . . . . .                             | takhhirm setao            |
| disposition, temper . . . . .                | mijâz ( <i>for mizâj</i> ) . . . . .                 | A. mijûz A.               |
| to distribute [as alms] . . . . .            | bakhsh tserâk . . . . .                              | P. W. bokhsh cheigao      |
| a divarication of a stream . . . . .         | tarân . . . . .                                      | tarâm T.                  |
| to divide into small pieces . . . . .        | zest khâk . . . . .                                  | rezâh cheig-an P. S.      |
| to do . . . . .                              | khâk, <i>or</i> gokh-n . . . . .                     | cheig-ao                  |
|                                              | gòkh-am, gôm . . . . .                               | kan-am, kakht             |
|                                              | gòkht-am . . . . .                                   | chaug-am                  |
|                                              | khötk . . . . .                                      | chaugj                    |
| docile, tame, tractable,<br>quiet . . . . .  | shov . . . . .                                       | shuv                      |
| a dog . . . . .                              | shâch . . . . .                                      | kûd                       |
| a wild dog . . . . .                         | kik . . . . .                                        | kâuj                      |
| the dog days . . . . .                       | tâmus . . . . .                                      | A. tumus A.               |
| a child's doll . . . . .                     | kitkân . . . . .                                     | jinjik P.                 |
| which has been done . . . . .                | khötk-ung . . . . .                                  | chaugj-enj                |
| a door . . . . .                             | bâr . . . . .                                        | P. divîr                  |
| a door socket . . . . .                      | görj . . . . .                                       | gargh                     |
| double-faced, deceitful . . . . .            | falfûs . . . . .                                     | P. kaibûr                 |
| doubt . . . . .                              | gumân . . . . .                                      | T. gumân P.               |



|                                                   | <i>Wakhi.</i>           | <i>Sarikoli.</i>        |    |
|---------------------------------------------------|-------------------------|-------------------------|----|
| a dove . . . .                                    | pakhtök . . . .         | pakhtäk . . . .         | T. |
| down . . . . .                                    | kilapâi . . . . .       | nughusûr . . . . .      |    |
| downwards . . . .                                 | kilapâi-mars . . . .    | nughusûr-dàs . . . .    | P. |
| to drag . . . . .                                 | kashun tseräk . . . .   | kakhelâ cheigao . . . . | P. |
| to draw (a sword, &c.,<br>out of a receptacle) .  | küng . . . . .          | nalfond-ao . . . . .    |    |
|                                                   | kün-am . . . . .        | nalfon-am . . . . .     |    |
|                                                   | kott-am . . . . .       | nalfond-am . . . . .    |    |
|                                                   | künetk . . . . .        | nalfondj . . . . .      |    |
| to draw a line, to score                          | chirgh-khâsh-an . . . . | chighîr-tizd-ao . . . . |    |
|                                                   | —— khâsh-am . . . . .   | —— tâz-am . . . . .     |    |
|                                                   | —— khâsht-am . . . . .  | —— tizd-am . . . . .    |    |
|                                                   | —— khâshetk . . . . .   | —— tizdj . . . . .      |    |
| to draw out, to extract . . . . .                 |                         | tizd-ao . . . . .       |    |
|                                                   |                         | tâz-am . . . . .        |    |
|                                                   |                         | tizd-am . . . . .       |    |
|                                                   |                         | tizdj . . . . .         |    |
| a dream . . . . .                                 | inât . . . . .          | khüdhm . . . . .        |    |
| to dream . . . . .                                | inât ving . . . . .     | khüdhm wândao . . . .   |    |
| to dress (one self) . . . .                       | pamets-an . . . . .     | pameig-ao . . . . .     |    |
|                                                   | { pamets-am . . . . .   | { pamez-am . . . . .    |    |
|                                                   | { pamest . . . . .      | { pamiz-d . . . . .     |    |
|                                                   | pamagn-am . . . . .     | pamaug-am . . . . .     |    |
|                                                   | pamakhk . . . . .       | pamaugj . . . . .       |    |
| to dress (other people)                           | pametsiv-an . . . . .   | pamedzând-ao, &c. . . . |    |
|                                                   | { pametsiv-am . . . . . |                         |    |
|                                                   | { pametsüv-d . . . . .  |                         |    |
|                                                   | pametsovd-am . . . . .  |                         |    |
|                                                   | pametsüvetk . . . . .   |                         |    |
| dried, dessicated . . . .                         | wesk vitk-üng . . . . . | ziäkhtj-enj . . . . .   |    |
| to drink . . . . .                                | pît-n . . . . .         | bròkht-ao . . . . .     |    |
|                                                   | pöv-am, pît . . . . .   | brâz-am . . . . .       |    |
|                                                   | pîtt-am . . . . .       | brukht-am . . . . .     |    |
|                                                   | pîtk . . . . .          | brukhtj . . . . .       |    |
| a drink made by mixing<br>water with whey . . . . | daghov . . . . .        | dughov . . . . .        |    |
| to drip . . . . .                                 | châk-an . . . . .       | khikt-ao . . . . .      | P. |
|                                                   | châk-am . . . . .       | khôk-am . . . . .       |    |
|                                                   | châkt-am . . . . .      | khikt-am . . . . .      |    |
|                                                   | chakatk . . . . .       | khiktj . . . . .        |    |



*Wakhi.**Sarikoli.*

|                                              |                           |    |                                                                   |    |
|----------------------------------------------|---------------------------|----|-------------------------------------------------------------------|----|
| to drive in [a nail], to<br>hammer . . .     | chuk-n . . .              |    | chàkt-ao<br>chàkk-am<br>chakt-am<br>chaktj                        |    |
| to drive . . .                               | hài tseràk, zatran khàk . |    | zatran cheigao ; <i>also</i><br>dét-ao<br>dé-am<br>det-am<br>detj |    |
| to be drowsy, to nod .                       | khhal khhöfs-an .         |    | khhal khhüfst-ao                                                  |    |
|                                              | khhal khhöfs-am .         |    | khhal khhüfs-am                                                   |    |
|                                              | khhal khöfst-am .         |    | khhal khhüfst-am                                                  |    |
|                                              | khhal khhöfsetk .         |    | khhal khhüfstj                                                    |    |
| a drug, medicine .                           | dârü, dawa .              | P. | dâri, dawà                                                        | P. |
| dry . . .                                    | wesk . . .                |    | ziàkhtj                                                           |    |
| to dry (intr.), to become<br>dry . . .       | wesk wâtsn . . .          |    | ziàkht-ao<br>ziègh-am<br>ziàkht-am<br>ziàkhtj                     |    |
| to dry (tr.) . . .                           | wesk khàk . . .           |    | ziaulând-ao<br>ziaulân-am<br>ziaulând-am<br>ziaulândj             |    |
| dung . . .                                   | sigin . . .               | P. | gharsh, sŭrŭn                                                     |    |
| during, as far as, as long<br>as, till . . . | batkan . . .              |    | — its, ta — its                                                   |    |
| dust . . .                                   | gàrd . . .                | P. | khhorm                                                            |    |
| dust, earth . . .                            | shet . . .                |    | sît                                                               |    |
| dye, colour . . .                            | rang . . .                | P. | rang                                                              | P. |
| <b>E.</b>                                    |                           |    |                                                                   |    |
| an eagle . . .                               | bispŭr . . .              |    | khtsŭvd                                                           |    |
| an ear . . .                                 | ghish . . .               |    | ghàul                                                             |    |
| earless . . .                                | chinák . . .              | T. | bé ghaul                                                          |    |
| early in the morning .                       | naghdîn, naghdînak .      |    | pigàn                                                             | P. |
| earnings, gain . . .                         | gotak . . .               |    | vig <i>or</i> vigào                                               |    |
| an earring . . .                             | gishniz . . .             |    | gakhnèz                                                           |    |
|                                              | ghish-pörg . . .          |    | ghàul safs                                                        |    |
|                                              | gŭshwâr . . .             | P. | gŭchwûr                                                           |    |
| earth, ground . . .                          | wûndr . . .               |    | zems                                                              |    |





|                                                               | <i>Wakhi.</i>                         | <i>Sarikoli.</i>             |
|---------------------------------------------------------------|---------------------------------------|------------------------------|
| earth, dust . . . .                                           | shet . . . .                          | sît                          |
| a lump of hard earth . . . .                                  | kilakhak . . . .                      | P. khàlg                     |
| East, sunrise. . . .                                          | yîr tserakhh . . . .                  | khhèr tserakhh               |
| easy . . . .                                                  | asân . . . .                          | P. âsân P.                   |
| to eat . . . .                                                | yît-an . . . .                        | khheig-ao                    |
|                                                               | yâw-am, yît . . . .                   | khhor-am, khhir-d            |
|                                                               | yitt-am . . . .                       | khhüg-am                     |
|                                                               | yîtk . . . .                          | khhügj                       |
| echo . . . .                                                  | tüngür . . . .                        | tüngür                       |
| an edge . . . .                                               | lav . . . .                           | P. lab P.                    |
|                                                               | yakâ . . . .                          | T. yakâ T.                   |
| an edging or binding . . . .                                  | zièk . . . .                          | T. zèak T.                   |
| white efflorescence [of<br>saltpetre ?] . . . .               | rezg . . . .                          | ravar                        |
| covered with efflorescence                                    | rezgin . . . .                        | ravârin                      |
| an egg . . . .                                                | falenz . . . .                        | kakkâ                        |
| eight . . . .                                                 | hât . . . .                           | wokht                        |
| eighty . . . .                                                | saksan . . . .                        | T. saksan T.                 |
| the elbow . . . .                                             | böret . . . .                         | yorn                         |
| an elm (said to grow in<br>Sarikol, not in<br>Wakhân) . . . . | sedâ . . . .                          | ? T. sedâ ? T.               |
| emaciated, lean . . . .                                       | khòt . . . .                          | khut                         |
| an ember . . . .                                              | zagürg . . . .                        | chugh T.                     |
| empty . . . .                                                 | ölk, püch . . . .                     | T. alk, puchak T.            |
| to empty out . . . .                                          | tösh-an <i>or</i> tösh tserak . . . . | tîs-ao <i>or</i> tîs cheigào |
|                                                               | tösh-am &c. . . .                     | tîs-am &c.                   |
|                                                               | tösht-am . . . .                      | tîst-am (?)                  |
|                                                               | töshetk . . . .                       | tîstj                        |
| to enclose, to besiege . . . .                                | kâbâl ding . . . .                    | kâbâl dhâdao                 |
| to encounter, to meet . . . .                                 | diebâr ding . . . .                   | diebâr dhâd-ao               |
| to endure, to last . . . .                                    | poi ding . . . .                      | poi cheigao                  |
| to endure, <i>or</i> suffer . . . .                           | poi ding . . . .                      | poi dhég-ao                  |
|                                                               |                                       | — dhor-am                    |
|                                                               |                                       | — dhaug-am                   |
|                                                               |                                       | — dhaugj                     |
| enduring . . . .                                              | poi-nâg . . . .                       | poi-nuk                      |
| to entangle . . . .                                           | pargöshöv-n . . . .                   | baradzein cheigao            |
|                                                               | pargöshöv-am                          |                              |
|                                                               | pargöshovd-am                         |                              |
|                                                               | pargöshövetk                          |                              |





|                                   | <i>Wakhi.</i>        | <i>Sarikoli.</i>      |       |
|-----------------------------------|----------------------|-----------------------|-------|
| entangled . . . .                 | pargöshetk . . . .   | baradzein             |       |
| to be entangled . . . .           | pargösh-n . . . .    | baradzein setao       |       |
|                                   | pargösh-am           |                       |       |
|                                   | pargösht-am          |                       |       |
|                                   | pargöshetk           |                       |       |
| to enter . . . .                  | chiram-n . . . .     | déid-ao               |       |
|                                   | cheram-am, cheram-d  | didh-am, dedhd        |       |
|                                   | chern-am . . . .     | deid-am               |       |
|                                   | chereng . . . .      | dedhj                 |       |
| to cause to enter, to             | chirmüiv-n . . . .   | duwâst-ao             |       |
| bring or take in, to in-          | chermüiv-am . . . .  | duwâdh-am             |       |
| troduce . . . .                   | chermovd-am . . . .  | duwust-am             |       |
|                                   | chermüivetk . . . .  | duwustj               |       |
| the entrail . . . .               | shingör . . . .      | raud                  | P.    |
| an entreaty, a humble             |                      |                       |       |
| petitioning . . . .               | shinjuâl . . . .     | valvâkh               |       |
| entire, complete . . . .          | drust . . . .        | P. putun              | T.    |
| an entrenchment . . . .           | dar-band . . . .     | P. chap               | T.    |
| to entrust . . . .                | tâwîl tserâk . . . . | A. W. tâwîl cheigao   | A. S. |
| an envoy . . . .                  | ilehi . . . .        | T. ilehi              | T.    |
| equal, same, [one sort] . . . .   | i rang . . . .       | W. P. i rang          | S. P. |
| equivalent . . . .                | chok . . . .         | ? T. asuk             |       |
| an error, a sin . . . .           | khhatâgi . . . .     | A. khhatâgi           | A.    |
| to estimate [weight, &c.] . . . . | chok-khak . . . .    | choḵ cheig-ao         |       |
| even, equal [in height] . . . .   | barâbar . . . .      | barôbar               | P.    |
| evening . . . .                   | pürz . . . .         | biurn, khum           | P.    |
|                                   |                      | [shâm]                |       |
| of the evening . . . .            | pürz-üng . . . .     | biurn-enj             |       |
| the evil eye . . . .              | kürdi . . . .        | kürdi                 | ? T.  |
| a ewe . . . .                     | stréi mai . . . .    | stîr màul             |       |
| to excavate, to dig . . . .       | parkol-n . . . .     | kaud-ao               |       |
|                                   | parkol-am . . . .    | kau-am                |       |
|                                   | parkold-am . . . .   | kaud-am               |       |
|                                   | parkoletk . . . .    | kaudj                 |       |
| in excess, excessive . . . .      | böshi . . . .        | bakhi (? for bàḵi A.) |       |
| to exchange . . . .               | âlish khâk . . . .   | T. âlish cheigao      | T.    |
| excitable, fiery . . . .          | chepsan . . . .      | jabuk                 |       |
| excrement . . . .                 | gi . . . .           |                       |       |
| to exert one's self, to           |                      |                       |       |
| make an effort . . . .            | zor tserâk . . . .   | zür cheigao           | P. S. |
| to be exhausted, or pros-         |                      |                       |       |
| trated . . . .                    | sest wâtsn . . . .   | süst setao            |       |



*Wakhi.**Sarikoli.*

|                                                                  |                   |                         |
|------------------------------------------------------------------|-------------------|-------------------------|
| to exhibit, to show, to<br>cause to see . . .                    | visüv-n . . .     | visând-ao               |
|                                                                  | visüv-am . . .    | visân-am                |
|                                                                  | visovd-am . . .   | visând-am               |
|                                                                  | visüvetk . . .    | visândj                 |
| to expel, to bring out .                                         | nikhing . . .     | zwâst-ao                |
|                                                                  | nikhind-am . . .  | zwâdh-am                |
|                                                                  | nikhit-am . . .   | zwâst-am                |
|                                                                  | nikhitk . . .     | zwâstj                  |
| to express, to squeeze<br>out . . .                              | wazem-n . . .     | sherzd-ao               |
|                                                                  | wazem-am . . .    | sherz-am                |
|                                                                  | wazemd-am . . .   | shirzd-am               |
|                                                                  | wazemetk . . .    | shirzdj                 |
| to extinguish, to cause<br>to go out, to put out<br>[fire] . . . | niüv-n . . .      | wazawând-ao, &c.        |
|                                                                  | niüv-am           |                         |
|                                                                  | noiövd-am         |                         |
|                                                                  | niüvetk           |                         |
| an eye . . .                                                     | chözm . . .       | P. tsem                 |
| the eye-brow . . .                                               | varào . . .       | varào                   |
| an eye-lash . . .                                                | skord . . .       | yeid                    |
| <b>F.</b>                                                        |                   |                         |
| the face . . .                                                   | rûi . . .         | P. pets                 |
| to face [towards] . . .                                          | rûi khàk . . .    | P. W. rûi cheigao P. S. |
| to fall . . .                                                    | wàz-n . . .       | wokhtao                 |
|                                                                  | wàz-am . . .      | wukh-am                 |
|                                                                  | wàsht-am . . .    | wokht-am                |
|                                                                  | wàshk . . .       | wokhtj                  |
| family [in the larger<br>sense] . . .                            | khhèsh kaum . . . | P. A. khèkh kaum P. A.  |
| famous . . .                                                     | nungi . . .       | P. nâmi P.              |
| far . . .                                                        | dhîr . . .        | ? P. dhâr ? P.          |
| far-sighted . . .                                                | chözm-in . . .    | P. tsem-in              |
| as far as, as long as, till,<br>during . . .                     | — batkan . . .    | —its, tâ—its            |
| farness . . .                                                    | dhîri . . .       | dhâri                   |
| fast [of a horse], light<br>[in weight] . . .                    | rànjik . . .      | rindz                   |
| fast, well-paced . . .                                           | weyàuin . . .     | weyàuin                 |



|                                                                 | <i>Wakhi.</i>          | <i>Sarikoli.</i>   |
|-----------------------------------------------------------------|------------------------|--------------------|
| a fast . . . . .                                                | richagh . . . ? P.     | ruchàn . . . P.    |
| to fasten a horse's head                                        |                        |                    |
| up short . . . . .                                              | kaizâ khâk . . . . .   | kaizâ cheig-ao     |
| fat, thick, stout . . . . .                                     | bâj, farbi P. . . . .  | divèz, farbé P.    |
| fat, grease . . . . .                                           | rogün . . . . .        | raun . . . P.      |
| refuse of fat left after                                        |                        |                    |
| boiling . . . . .                                               | jaghzak . . . ? T.     | jaghzak . . . ? T. |
| a fat sheep . . . . .                                           | pos . . . . .          | pes                |
| father . . . . .                                                | tât . . . . .          | pid, atâ T.        |
| father-in-law . . . . .                                         | khurs . . . ? P.       | khhasur . . . P.   |
|                                                                 | bâghi tât . . . . .    | boghi atâ          |
| fatigue, tiredness . . . . .                                    | warekhgi . . . . .     | warezdagi          |
| a fault, a mistake . . . . .                                    | khhatâgi . . . A. P.   | khbatâ . . . A.    |
| a favourite or pet child . . . . .                              | nâzyân . . . . .       | nûzyân . . . P.    |
| to fear, to be afraid . . . . .                                 | washuk-an . . . . .    | khûj dheigao       |
|                                                                 | washi-am } . . . . .   | —— dhor-am         |
|                                                                 | wish-it } . . . . .    | —— dhaug-am        |
|                                                                 | washt-am . . . . .     | —— dhaugj          |
|                                                                 | wushetk . . . . .      |                    |
| fear, fright . . . . .                                          | washuk . . . . .       | khûj               |
| fearful . . . . .                                               | washuk-kûzg . . . . .  | khûj dheig-ichoz   |
| a feast . . . . .                                               | tôi . . . . .          | téi . . . T.       |
| to feel, to experience                                          |                        |                    |
| [mentally] . . . . .                                            |                        | dheig-ao           |
|                                                                 |                        | dhor-am            |
|                                                                 |                        | dhaug-am           |
|                                                                 |                        | dhaugj             |
| a feeding tube [for babies]                                     | upchi . . . . .        | ruvj               |
| a felt . . . . .                                                | ijîn . . . . .         | jéin               |
| a female . . . . .                                              | stréi . . . . .        | stir               |
| a thorn fence . . . . .                                         | chit . . . . .         | chít . . . T.      |
| to ferment, to rise [as dough], to foam [as water in a torrent] | pödhmōsh-an . . . . .  | baleid-ao          |
|                                                                 | pödhmōsh-am . . . . .  | balis-am           |
|                                                                 | pödhmōsht-am . . . . . | baleid-am          |
|                                                                 | pödhmōshetk . . . . .  | baledhj            |
| fever and ague . . . . .                                        | andav . . . . .        | bazgāk . . . T.    |
| a stubble field . . . . .                                       | naghaz . . . . .       | naghaz             |
| fiery, excitable . . . . .                                      | chepsân . . . . .      | jâbuk              |
| fifty . . . . .                                                 | pinjâh . . . . .       | pinjûh . . . P.    |
| a fight . . . . .                                               | ghâsh, jang P. . . . . | ghâsh, jang P.     |



*Wakhi.**Sarikoli.*

|                                                           |                    |                |      |
|-----------------------------------------------------------|--------------------|----------------|------|
| to fight together [of ani-<br>mals]                       | māk-an             | zghôd-ao       |      |
|                                                           | māk-am             | zghâu-am       |      |
|                                                           | mākt-am            | zghôd-am       |      |
|                                                           | maketk             | zghôdhj        |      |
| a file                                                    | chafsâh            | chafsuh        |      |
| to fill                                                   | ṭi khāk           | pür cheigao    |      |
| to fill into receptacles<br>from a store of any-<br>thing | khözn-n            | pakhchüg-ao    |      |
|                                                           | khözn-am           | pakhchor-am    |      |
|                                                           | khögn-am           | pakhchüg-am    |      |
|                                                           | khökhg             | pakhchügj      |      |
| to filter, to strain                                      | schachüv-n         | kardâzd-ao     |      |
|                                                           | schachüv-am        | kardâz-am      |      |
|                                                           | schachovd-am       | kardâzd-am     |      |
|                                                           | schachüvetk        | kardâz dj      |      |
| to find, to receive, to<br>obtain                         | got-āk             | vig-ao         |      |
|                                                           | gôt-am             | varé-am        |      |
|                                                           | gott-am            | vüg-am         |      |
|                                                           | gotetk             | vügj           |      |
| fine powder, <i>also</i> soft                             | pālm               | pādhm          |      |
| a fine                                                    | tawéni             | tawâni         | P.   |
| a finger                                                  | yàngl              | ingākht        | P.   |
| the little finger                                         | ziklai yàngl       | zilaḡ ingākht  |      |
| the 3rd, 2nd and 1st<br>fingers                           | malung yàngl       | madhân ingākht |      |
| a finger-nail, a claw                                     | dgör               | nashaur        |      |
| to finish, to come to an<br>end                           | adâ wātsn          | adâ set-ao     |      |
| to finish (tr.)                                           | adâ khāk or tserāk | adâ cheigao    |      |
| fire                                                      | rakhhnig           | yuts           |      |
| a fire-place, a hearth                                    | dildong            | katsur         |      |
| first (adj.)                                              | îw-ao              | îw-ao          |      |
| first (adv.)                                              | prüt               |                |      |
| a fish                                                    | mai                | mui            | P.   |
| a fish-hook                                               | changak            | changāk        | P.   |
| the fist                                                  | möst               | mut            | P. ? |
| five                                                      | pānz               | pinz           |      |
| a flame                                                   | rāju               | sāuz           |      |



|                                                  | <i>Wakhi.</i>                    |  |  |       | <i>Sarikoli.</i>         |  |      |    |
|--------------------------------------------------|----------------------------------|--|--|-------|--------------------------|--|------|----|
| to flame up . . .                                | pidhing                          |  |  |       |                          |  |      |    |
|                                                  | pidhing-am                       |  |  |       |                          |  |      |    |
|                                                  | pidhn-am                         |  |  |       |                          |  |      |    |
|                                                  | pidhnetk                         |  |  |       |                          |  |      |    |
| a flank, a side . . .                            | shunj . . . . .                  |  |  |       | khaun                    |  |      |    |
| flat . . . . .                                   | anwâr . . . . .                  |  |  |       | anwûr                    |  | ? P. |    |
|                                                  | pâkhj . . . . .                  |  |  |       | pâkhj                    |  |      |    |
| flax, linseed ( <i>none grown</i> )              | zaghir . . . . .                 |  |  | T.    | zaghir                   |  |      | T. |
| to flay, to kill . . . . .                       |                                  |  |  |       | kokht-ao                 |  |      |    |
|                                                  |                                  |  |  |       | kegh-am                  |  |      |    |
|                                                  |                                  |  |  |       | kokht-am                 |  |      |    |
|                                                  |                                  |  |  |       | kokhtj                   |  |      |    |
| a flea . . . . .                                 | spardhenj . . . . .              |  |  |       | bürgâh                   |  |      | T. |
| to flee . . . . .                                | rödh-n . . . . .                 |  |  |       | ratsist-ao               |  |      |    |
|                                                  | rödh-am . . . . .                |  |  |       | ratsedh-am               |  |      |    |
|                                                  | rön-am . . . . .                 |  |  |       | ratsüst-am               |  |      |    |
|                                                  | röng . . . . .                   |  |  |       | ratsüstj                 |  |      |    |
| flint and steel . . . . .                        | chikhmâk ghâr . . . . .          |  |  |       | tsâkhmâk zêr             |  |      |    |
| a flock . . . . .                                | bakhsh . . . . .                 |  |  |       | tup                      |  |      | T. |
| flocks and herds . . . . .                       | kalâ . . . . .                   |  |  | P.    | kalâ, mul                |  |      | P. |
| to flood (spoken of the water), to be spread out | werkhhar-an . . . . .            |  |  |       | walid-ao                 |  |      |    |
|                                                  | werkhhar-am . . . . .            |  |  |       | walis-am                 |  |      |    |
|                                                  | werkhhart-am . . . . .           |  |  |       | walüid-am                |  |      |    |
|                                                  | werkhharetk . . . . .            |  |  |       | walüidj                  |  |      |    |
| to cause to flood to spread out (tr.) . . . . .  | werkhühv-n . . . . .             |  |  |       | waléisând-ao             |  |      |    |
|                                                  | werkhühv-am . . . . .            |  |  |       | &c.                      |  |      |    |
|                                                  | werkhhovd-am                     |  |  |       |                          |  |      |    |
|                                                  | werkhühvetk                      |  |  |       |                          |  |      |    |
| a flood . . . . .                                | sîl . . . . .                    |  |  | A.    | sèil                     |  |      | A. |
| flour . . . . .                                  | yumj . . . . .                   |  |  |       | yogz                     |  |      |    |
| to flow . . . . .                                | tuk-n ( <i>to go</i> ) . . . . . |  |  |       | tid-ao ( <i>to go</i> ). |  |      |    |
| a flower . . . . .                               | spragh . . . . .                 |  |  |       | gûl                      |  |      | P. |
| a flower pot . . . . .                           | spragh-dân . . . . .             |  |  | W. P. | gûl-dân                  |  |      | P. |
| a fly . . . . .                                  | maks . . . . .                   |  |  | P.    | chingin                  |  |      |    |
| to fly . . . . .                                 | rawez-n . . . . .                |  |  |       | rawikht-ao               |  |      |    |
|                                                  | râwez-am . . . . .               |  |  |       | râwâz-am                 |  |      |    |
|                                                  | râwezd-am . . . . .              |  |  |       | rawükht-am               |  |      |    |
|                                                  | râwazetk . . . . .               |  |  |       | rawükhtj                 |  |      |    |



|                                              | <i>Wakhi.</i>                                                    |       | <i>Sarikoli.</i>                                                   |       |
|----------------------------------------------|------------------------------------------------------------------|-------|--------------------------------------------------------------------|-------|
| to cause to fly . . .                        | rawazüv-n . . .<br>ràuzav-am<br>rawazovd-am<br>ràuzüvetk         |       | rawazând-ao, &c.                                                   |       |
| foam . . .                                   | khuf                                                             |       | khhef                                                              |       |
| a fog, a mist . . .                          | bis . . .                                                        | Y.    | büs                                                                | Y.    |
| a fog, a cloud . . .                         | mur . . .                                                        |       | varm                                                               |       |
| a fold (of cloth, &c.) . . .                 | tâ . . .                                                         |       | tu                                                                 | P.    |
| a sheep-fold . . .                           |                                                                  |       | gal                                                                |       |
| to fold (sheep) . . .                        | tané-in . . .<br>tané-am . . .<br>tanet-am . . .<br>tanetk . . . |       | duwâst-ao (to cause to<br>duwâdham [enter)<br>duwust-am<br>duwustj |       |
| to follow, to pursue . . .                   | zatran khâk . . .                                                |       | zatran cheig-ao                                                    |       |
| a fool . . .                                 | gul . . .                                                        |       | ahmak                                                              | A.    |
| a foot, a leg . . .                          | püdh . . .                                                       |       | pedh                                                               |       |
| a footman, a man on foot . . .               | piâdhâh . . .                                                    |       | piâdâh                                                             | P.    |
| a foot-track . . .                           | podh . . .                                                       |       | pedh                                                               |       |
| a ford . . .                                 | türt . . .                                                       |       | paug                                                               |       |
| to ford, to wade . . .                       | türt ding . . .                                                  |       | paug dhâdao                                                        |       |
| the forearm . . .                            | yurm . . .                                                       |       | cheröst                                                            |       |
| the forehead . . .                           | rûk . . .                                                        |       | râk                                                                |       |
| former, ancient . . .                        | mis-ung, tar-mis-ung . . .                                       |       | prôd-enj                                                           |       |
| formerly . . .                               | mis (= nose) . . .                                               |       | prôd                                                               |       |
| a fort . . .                                 | kalhâ . . .                                                      | A.    | kalâ                                                               | A.    |
| fortieth . . .                               | chil-ao . . .                                                    | P.    | châl-ao                                                            | P.    |
| forty . . .                                  | chil . . .                                                       | P.    | châl                                                               | P.    |
| a foster brother or sister . . .             | zârz . . .                                                       |       | zorz                                                               |       |
| a foster child . . .                         | zârz zamân . . .                                                 |       | zorz balâh                                                         | S. T. |
| four . . .                                   | tsabür . . .                                                     |       | tsavor                                                             |       |
| fourth . . .                                 | tsabürao . . .                                                   |       | tsavorao                                                           |       |
| a fowl, a cock . . .                         | körk . . .                                                       |       | tûkhî                                                              | T.    |
| a fowl-house . . .                           | yost . . .                                                       |       | chelyò                                                             |       |
| a fox . . .                                  | nakhchir . . .                                                   |       | râpts                                                              |       |
| to free, to release . . .                    | khhalâs khâk . . .                                               |       | khhalûs cheigao                                                    | P.    |
| to freeze . . .                              | yikh vadhâk . . .<br>yikh tserâk . . .                           | P. W. | shtu vistao<br>sorj setao                                          |       |
| fresh, new . . .                             | tazah . . .                                                      | P.    | tuzah                                                              |       |
| a friend . . .                               | dost . . .                                                       | P.    | dest                                                               | P.    |
| to become friends, to be<br>reconciled . . . | âsht wâtsn . . .                                                 | P. W. | ukht setao                                                         | P. S. |





|                                              | <i>Wakhi.</i>                                                                | <i>Sarikoli.</i>                                                          |       |
|----------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------|
| to frighten . . .                            | washiüv-n . . .<br>washiüv-am . . .<br>washiovd-am . . .<br>washiüvetk . . . | khâwând-ao . . .<br>khâwân-am . . .<br>khâwând-am . . .<br>khâwândj . . . |       |
| to frighten, cause to shy                    | witriüv-n . . .<br>witriüv-am . . .<br>wotriovd-am . . .<br>witriüvetk . . . | intreisând-ao, &c. . .                                                    |       |
| a fringe . . .                               | pulk . . .                                                                   | pulk . . .                                                                |       |
| a frog . . .                                 | mukt . . .                                                                   | kharbèj . . .                                                             |       |
| frost . . .                                  | ayâz . . .                                                                   | ayûz . . .                                                                | T.    |
| from, than . . .                             | tsa or sa (with the<br>oblique case in -an) . . .                            | az ——— . . .                                                              | P.    |
| frozen, (of earth, &c.) . . .                | yikh . . .                                                                   | sorjîn . . .                                                              |       |
| frozen, (of liquids) . . .                   | yikh . . .                                                                   | shtu sedhj . . .                                                          |       |
| fruit . . .                                  | miwâ . . .                                                                   | méwâ . . .                                                                | P.    |
| a fruit stone . . .                          | kütük . . .                                                                  | rukchi . . .                                                              | Y.    |
| to fry . . .                                 | varesh-n . . .<br>varesh-am . . .<br>varesh-t-am . . .<br>vareshetk . . .    | virzd-ao . . .<br>virz-am . . .<br>virzd-am . . .<br>virz-dj . . .        |       |
| <i>also</i>                                  |                                                                              | stipt-ao . . .<br>stob-am . . .<br>stipt-am . . .<br>stiptj . . .         |       |
| fuel . . .                                   | gûz . . .                                                                    | zez . . .                                                                 |       |
| to be full . . .                             | tçi wâtsn . . .                                                              | pür setao . . .                                                           | P. S. |
| full moon . . .                              | pür zûmak . . .                                                              | pür mâs . . .                                                             |       |
| a fur cap . . .                              | tumagh . . .                                                                 | tumagh . . .                                                              |       |
| a fur robe . . .                             | karast . . .                                                                 | warbûn . . .                                                              |       |
| an irrigation furrow . . .                   | chinak . . .                                                                 | chenâk . . .                                                              |       |
| on the further side . . .                    | trâ (tar-yâ) pür<br>yâ sâr . . .                                             | tar wi pur . . .<br>tar wi sâr . . .                                      |       |
| <b>G.</b>                                    |                                                                              |                                                                           |       |
| galled (horse, &c.) . . .                    | kupt . . .                                                                   | nukhtj . . .                                                              |       |
| to gallop (intr.) . . .                      | göfs-an . . .                                                                | zokt-ao . . .                                                             |       |
| to gallop (tr.), to cause<br>to gallop . . . | göfsiv-n . . .<br>göfsiv-am . . .<br>göfsovd-am . . .<br>göfsivetk . . .     | dawând-ao . . .<br>dawân-am . . .<br>dawând-am . . .<br>dawândj . . .     |       |



|                                                               | <i>Wakhi.</i>                                                             | <i>Sarikoli.</i>                                                             |
|---------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------|
| to gather (one by one)                                        | chüp-an . . .<br>chüp-am . . .<br>chövd-am . . .<br>chöfk . . .           | tsevd-ao . . .<br>tsev-am . . .<br>tsevd-am . . .<br>tsevdj . . .            |
| a gelding . . .                                               | akhhtà . . .                                                              | akhhtà T.                                                                    |
| a gimlet or centre bit . . .                                  | barmàh . . .                                                              | barmàh P.                                                                    |
| a girdle . . .                                                | miün, tàband W. P.                                                        | miünd, tàbànd S. P.                                                          |
| a girth . . .                                                 | taràng . . . ? P.                                                         | türong ? P.                                                                  |
| to give . . .                                                 | radhà-n . . .<br>rànd-am . . .<br>ràtt-am or dhett-am . . .<br>ràtk . . . | dhâd-ao . . .<br>dhâ-m, dhî-d . . .<br>dhâd-am, . . .<br>dhâdj . . .         |
| gleanings . . .                                               | sar-chöfk (lit. <i>head-gathered</i> ) . . .                              | kâl-tsevdj ( <i>do.</i> ) . . .                                              |
| to glitter, to glisten . . .                                  | jellàs tseràk . . .                                                       | pollàs cheig-ao . . .                                                        |
| glue . . .                                                    | sharish . . . P.                                                          | serèkh P.                                                                    |
| to go [move to], <i>also</i> to become [ <i>setao</i> ] . . . | rach-an . . .<br>rach-am, rash-t . . .<br>ragd-am . . .<br>rakhk . . .    | set-ao . . .<br>sô-m, saud . . .<br>süt-am . . .<br>sedhj . . .              |
| to go, to walk ( <i>indef.</i> ) . . .                        | tuk-an . . .<br>chau-am, chit . . .<br>taghd-am . . .<br>takhk . . .      | tîd-ao . . .<br>tedz-am, tiz-d . . .<br>tüid-am . . .<br>tüidj . . .         |
| to cause to go away, to remove . . .                          | chawüv-n* . . .<br>chawüv-am . . .<br>chawovd-am . . .<br>chawüvetk . . . | tedzând-ao . . .<br>tedzân-am . . .<br>tedzând-am . . .<br>tedzândj . . .    |
| to go <i>or</i> come out <i>or</i> up . . .                   | niuz-an . . .<br>niuz-am . . .<br>niesht-am . . .<br>nieshk . . .         | nakhtig-ao . . .<br>nakhti-am . . .<br>nakhtüg-am . . .<br>nakhtügj . . .    |
| to go out [of fire] . . .                                     | niü-n . . .<br>niü-am, niyi-t . . .<br>neit-am . . .<br>nietk . . .       | wazid-ao . . .<br>wazéw-am, wazau-d . . .<br>wazüd-am . . .<br>wazüdhj . . . |

\* Apparently the Causative of a verb *chau-an*, of which only the Present Tense remains. This is used as the Present Tense of the verb *tuk-an*, (see above) which seems to have lost its own.





|                                             | <i>Wakhi.</i>                                |   | <i>Sarikoli.</i>                                                |    |
|---------------------------------------------|----------------------------------------------|---|-----------------------------------------------------------------|----|
| to cause to go out (fire),<br>to extinguish | niüv-n .<br>niüv-am<br>noiövd-am<br>niüvetk  | . | wazawând-ao<br>&c.                                              |    |
| to go round, to dance, to<br>go over        | gir-an .<br>gir-am .<br>gird-am<br>giretk .  | . | gherd-ao<br>ghirs-am<br>gherd-am<br>gherdj                      |    |
| a goat .                                    | tugh, buch                                   | . | vâz, reidz                                                      |    |
| goat's down [pashm or<br>shawl-wool] .      | margilam                                     | . | tibît                                                           | T. |
| goat's hair .                               | dhürs .                                      | . | dhors                                                           |    |
| goats and sheep .                           | jândâr .                                     | . | P. rezapai (? scattered<br>feet P.)                             |    |
| a goitre .                                  | zaghâr .                                     | . | pukhhâk                                                         | T. |
| gold .                                      | tillâ .                                      | . | tillû                                                           |    |
| good .                                      | bâf .                                        | . | chârj                                                           |    |
| goods .                                     | .                                            | . | mul [mâl]                                                       | P. |
| goose .                                     | ghâz .                                       | . | ghâz                                                            | P. |
| a gorge, a ravine .                         | jirâv, dhôr .                                | . | darâh, dhèr                                                     | P. |
| gossiping .                                 | bi-zanâkhh<br>(without lower jaw)            | . | bi-zangân<br>(without lower jaw)                                |    |
| grain with the husk on .                    | drengal                                      | . | char                                                            | T. |
| a grandfather .                             | pûp .                                        | . | bâb                                                             |    |
| a grandmother .                             | mum .                                        | . | mâm                                                             |    |
| a grandson .                                | napûs .                                      | . | nabûs                                                           |    |
| a granddaughter .                           | do. .                                        | . | do.                                                             |    |
| grass .                                     | wûsh .                                       | . | wukh                                                            |    |
| lucerne grass .                             | wujerk (has a yellow<br>flower as in Tibet)  | . | bedâ (with flowers<br>yellow, white and<br>blue, as in Yarkand) | T. |
| dhub grass .                                | ghéshâ .                                     | . | ghéshâ                                                          |    |
| a grasshopper .                             | milakhh                                      | . | malakhh                                                         | P. |
| to grasp, to press .                        | trânj-an<br>trânj-am<br>trânjd-am<br>trâkhhk | . | waghrakht-ao<br>waghréig-am<br>waghrakht-am<br>waghrakhtj       |    |



|                                   | <i>Wakhi.</i>                                      |       | <i>Sarikoli.</i> |         |
|-----------------------------------|----------------------------------------------------|-------|------------------|---------|
| to grasp, to seize                | wadhür-n                                           |       | wadhord-ao       |         |
|                                   | wudhür-am                                          |       | wadhor-am        |         |
|                                   | wodhord-am                                         |       | wadhord-am       |         |
|                                   | wudhuretk                                          |       | wadhordj         |         |
| grease, fat                       | rogün                                              | P.    | raun             | P.      |
| great, big                        | lup                                                |       | laur             |         |
| green                             | sävz                                               |       | sävz             | P.      |
| grey (colour of a horse)          | sharkhhün                                          |       | karabôz          | T.      |
| to grieve                         | gham tseräk                                        | A. W. | gham cheigao     | A. S.   |
| to grin                           | jök khäk                                           |       | jiek cheigao     |         |
| to grind                          | chärkht khhàsh-an                                  |       | chorkh tizd-ao   |         |
| grizzled                          | yekh                                               |       | chäl             | T.      |
| a grub (that eats cloth)          | wich                                               |       | kuwâh            | T.      |
| to grudge                         | jahüdi khäk (lit. <i>to do</i><br><i>the Jew</i> ) |       | jahüdi cheig-ao  |         |
|                                   | tkhheiri tseräk                                    |       | abòì cheigao     | ? P. S. |
| to guard                          | nigàh khäk                                         | P. W. | nigàh cheigao    | P. S.   |
| a guide,                          | sàr tseräk-küzg                                    |       | sàr-kün          | P.      |
| to guide, to precede              | sàr khäk                                           |       | sàr cheigao      |         |
| a gun                             | miltek                                             |       | miltek           | T.      |
| the gut                           | kütàn                                              |       | kütàn            | T.      |
| a gutter                          | sarjen                                             |       | tabèn            |         |
| H.                                |                                                    |       |                  |         |
| hair (of the head)                | shâfsh                                             |       | khâd             |         |
| hair (on the body)                | rip                                                |       | reb              |         |
| half                              | choti, pimâh                                       |       | nimâh            | P.      |
| a halter                          | sàr-band                                           | P.    | kâl-band         | P.      |
| to hammer                         | chuk-an                                            |       | chàkt-ao         |         |
|                                   | chuk-am                                            |       | chàkk-am         |         |
|                                   | chukt-am                                           |       | chàkt-am         |         |
|                                   | chuketk                                            |       | chàktj           |         |
| a hand                            | dhast                                              |       | dhüst            |         |
| a handful                         | mich                                               |       | mut              | P.      |
| a double handful                  | mich                                               |       | ingrôv           |         |
| a handkerchief                    | rimâl                                              | P.    | reimâl           | P.      |
| the handle (of any tool)          | wâdh                                               |       | wièdh            |         |
| handsome, good-looking            | khush-rûi                                          | P.    | khühsh rûi       | P.      |
| to hang from a peg &c.<br>(intr.) | ziröv-n                                            |       | ingàkhht-ao      |         |
|                                   | ziröv-am                                           |       | ingàkhhs-am      |         |
|                                   | zirögn-am                                          |       | ingàkhht-am      |         |
|                                   | zirökhk                                            |       | ingàkhhtj        |         |



|                                                    | <i>Wakhi.</i>                                                      |       | <i>Sarikoli.</i>                                            |       |
|----------------------------------------------------|--------------------------------------------------------------------|-------|-------------------------------------------------------------|-------|
| happy, well . . .                                  | sihât . . .                                                        | A.    | tinj . . .                                                  | T.    |
| to be happy . . .                                  | khûsh wakhht wâtsn . . .                                           |       | khûsh wakhht setao . . .                                    |       |
| hard . . .                                         | tung . . .                                                         |       | teng . . .                                                  |       |
| hardly, with difficulty . . .                      | azâr ghilâh . . .                                                  | P. W. | azûr ghilâh . . .                                           | P. S. |
| a hare . . .                                       | sûi . . .                                                          |       | khtûm . . .                                                 |       |
| haste, hurry . . .                                 | iztrâb . . .                                                       | A.    | jâti . . .                                                  | ? P.  |
| to hasten, to hurry . . .                          | iztrâb khâk . . .                                                  | A. W. | jâti cheigao . . .                                          | P. S. |
| a hatchet, an axe . . .                            | tipar . . .                                                        | P.    | baldah . . .                                                | T.    |
| I have, thou hast, &c. . .                         | zû — tei, ti — tei, &c.<br>( <i>my — is</i> ) ( <i>thy — is</i> ). |       | mu—yost, tû—yost, &c.<br>( <i>my—is</i> ) ( <i>thy—is</i> ) |       |
| a kind of hawk (karchi-<br>ghah, T.) . . .         | shâin . . .                                                        |       | shôin . . .                                                 |       |
| the head . . .                                     | sâr . . .                                                          | P.    | kâl . . .                                                   | P.    |
| the back of the head . . .                         | tor . . .                                                          |       | tur . . .                                                   |       |
| a headman (of a village,<br>&c.) . . .             | arbâb . . .                                                        |       | arbôb . . .                                                 | A.    |
| a heap (of grain) . . .                            | sor . . .                                                          |       | sor . . .                                                   |       |
| to heap up . . .                                   | sor khâk . . .                                                     |       | sor cheigao . . .                                           |       |
| to hear . . .                                      | kshûin . . .                                                       |       | khûd-ao . . .                                               |       |
|                                                    | kshûi-am . . .                                                     |       | khân-am . . .                                               |       |
|                                                    | kshôn-am . . .                                                     |       | khûd-am . . .                                               |       |
|                                                    | kshông . . .                                                       |       | khiedhj . . .                                               |       |
| heart . . .                                        | püzüv . . .                                                        |       | zârd . . .                                                  |       |
| heart (metaph.), mind . . .                        | dil . . .                                                          |       | dil . . .                                                   | P.    |
| a hearth, a fire-place . . .                       | dildong . . .                                                      |       | katsûr . . .                                                |       |
| the heel . . .                                     | posht, pâshnâh . . .                                               | P.    | naburg, pukhnâh . . .                                       | P.    |
| height, tallness . . .                             | kâd . . .                                                          | A.    | kâd . . .                                                   | A.    |
| height-sickness [from<br>rarefaction of air] . . . | sudhgh . . .                                                       |       | sûdhgh . . .                                                |       |
| a hem . . .                                        | parsits . . .                                                      |       | parasits . . .                                              |       |
| to hem . . .                                       | namil-n . . .                                                      |       | dhafs dhâdao . . .                                          |       |
|                                                    | namil-am . . .                                                     |       | &c. . .                                                     |       |
|                                                    | namild-am . . .                                                    |       |                                                             |       |
|                                                    | namiletk . . .                                                     |       |                                                             |       |
| hemp fibre [none grown] . . .                      | chigâ . . .                                                        | T.    | chigâ . . .                                                 | T.    |
| a hen . . .                                        | strèi kôrk, makian . . .                                           |       | makian . . .                                                |       |
| a herdsman . . .                                   | shüpün . . .                                                       | P.    | ghûbün . . .                                                | P.    |
| here ! [interj.] . . .                             | inké . . .                                                         |       | yamâ . . .                                                  |       |
| here (adv.) . . .                                  | dram, ha-dram . . .                                                |       | âud . . .                                                   |       |
| a hero, also a man "vir" . . .                     | mard . . .                                                         | P.    | chûrik . . .                                                |       |
| high . . .                                         | wuch . . .                                                         |       | bilik, biland . . .                                         | P.    |
| a hillock . . .                                    | boq . . .                                                          |       | béaq . . .                                                  |       |



|                                                                                                                      | <i>Wakhi.</i>                      |       | <i>Sarikoli.</i> |       |
|----------------------------------------------------------------------------------------------------------------------|------------------------------------|-------|------------------|-------|
| hindmost . . .                                                                                                       | sibàs-üng . . .                    |       | zabô-yenj        |       |
| hinge [wooden pins, revolving in a hole] . . .                                                                       | görj . . .                         |       | gargh            |       |
| the hip bone . . .                                                                                                   | shunj sâr (lit. <i>side-head</i> ) |       | khaun kâl        |       |
| on the hither side of (p.p.) . . .                                                                                   | — yem sâr . . .                    |       | — mi sâr         |       |
| on the hither side (adv.)                                                                                            | tram ( <i>tar-yem</i> ) pür . . .  |       | tar mi pur       |       |
| a hobble [for a horse's legs] . . .                                                                                  | kishôn . . .                       | T.    | kashân           | T.    |
| a hoe . . .                                                                                                          | kitmôn . . .                       | T.    | ketman           | T.    |
| to hoe, to dig up . . .                                                                                              |                                    |       | chappârd-ao      |       |
|                                                                                                                      |                                    |       | chappâr-am       |       |
|                                                                                                                      |                                    |       | chappârd-am      |       |
|                                                                                                                      |                                    |       | chappârdj        |       |
| a hog . . .                                                                                                          | khüg . . .                         |       | khaug            | P.    |
| a hole, an aperture . . .                                                                                            | sêrv . . .                         |       | dârz             | P.    |
| hollow . . .                                                                                                         | kuwok . . .                        |       | kâwuk            | ? T.  |
| the hollow of the hand . . .                                                                                         | pun                                |       |                  |       |
| a hoof [of a horse] . . .                                                                                            | süm . . .                          | P.    | süm              | P.    |
| a cloven hoof . . .                                                                                                  | shilch . . .                       |       | khalzâk          |       |
| to hop ( <i>to fly</i> ) . . .                                                                                       | rawez-n . . .                      |       | rawikht-ao       |       |
|                                                                                                                      | rawez-am . . .                     |       | rawâz-am         |       |
|                                                                                                                      | rawezd-am . . .                    |       | rawükhht-am      |       |
|                                                                                                                      | rawazetk . . .                     |       | rawükhtj         |       |
| a horn . . .                                                                                                         | shao . . .                         |       | khao             |       |
| hornless . . .                                                                                                       | kâl . . .                          |       | kâl              |       |
| a horse . . .                                                                                                        | yâsh . . .                         |       | vurj             |       |
| to put on horseback . . .                                                                                            | sowâr khâk . . .                   | P. W. | suwûr cheigao    | P. S. |
| horse-clothing . . .                                                                                                 | prigîn . . .                       |       | parwein          |       |
| a horseman, a rider . . .                                                                                            |                                    |       | vurjin           |       |
| a horse shoe . . .                                                                                                   | nâl . . .                          |       | nâl              | A.    |
| hospitality . . .                                                                                                    | memandâri . . .                    |       | memâni           | P.    |
| hot . . .                                                                                                            | shùndr . . .                       |       | zürm             | ? P.  |
| to become hot . . .                                                                                                  | to v wâtsn . . .                   |       | tuv setao        |       |
| a house [built with flat roofs, a hole in the centre of the ceiling for smoke, and raised dâis round the walls . . . | khhun . . .                        | P.    | chêd             |       |
| a household, <i>also</i> quarters, a camp . . .                                                                      | qosh . . .                         | T.    | keshüm, kushum   | T.    |



|                                     | <i>Wakhi.</i>    |       | <i>Sarikoli.</i>      |       |
|-------------------------------------|------------------|-------|-----------------------|-------|
| a household slave . . .             | khâna zâd . . .  |       | khâna zâd . . .       |       |
| how, <i>also</i> what like ? . . .  | tša-kum-an . . . |       | az ka . . .           | P. S. |
| how ? . . .                         | tša rang . . .   | W. P. | tša rang . . .        | S. P. |
| how many, how much . . .            | tsum . . .       |       | tsund . . .           | P.    |
| to howl, to bay together . . .      | varüi-n . . .    |       | varaud-ao . . .       |       |
| (as dogs) . . .                     | varüy-am . . .   |       | varau-am . . .        |       |
|                                     | varoid-am . . .  |       | varüd-am . . .        |       |
|                                     | varüyetk . . .   |       | varaudj . . .         |       |
| a (camel's) hump . . .              | kap . . .        |       | kiep . . .            |       |
| hump-backed . . .                   | düw . . .        |       | cheng . . .           |       |
| a hundred . . .                     | sad . . .        | P.    | sad . . .             | P.    |
| hungry . . .                        | marz . . .       |       | marzânj, marzun . . . |       |
| to be <i>or</i> become hungry . . . | marz wâtsn . . . |       | marzânj set-ao . . .  |       |
| hunting, sport . . .                | shkâr . . .      | P.    | gièw . . .            |       |
| a husband . . .                     | shawar . . .     | P.    | chur . . .            | ? P.  |
| a hut . . .                         | ktîch . . .      |       | garma . . .           |       |

# I.

|                                 |                                       |                                       |            |
|---------------------------------|---------------------------------------|---------------------------------------|------------|
| I (pron.) . . .                 | wuz, <i>also</i> am [see Gram.] . . . | waz, <i>also</i> am [see Gram.] . . . |            |
| an ibex . . .                   | yuksh . . .                           | yakh, <i>also</i> rüsht ghüej, . . .  | "red deer" |
| female, ditto . . .             | vazik tugh . . .                      | ghüej vâz . . .                       |            |
|                                 | (deer goat) . . .                     | (deer goat) . . .                     |            |
| ice . . .                       | yikh . . .                            | P. shtu . . .                         |            |
| idea . . .                      | yâd ( <i>recollection</i> ) . . .     | P. yôd . . .                          | P.         |
| idle, lazy . . .                | kalgi tserâk-küzg . . .               | . . . vanao kün . . .                 | S. P.      |
| ill . . .                       | bimâr . . .                           | P. bemûr . . .                        | P.         |
| ill-advised, who will not . . . |                                       |                                       |            |
| take counsel . . .              | nažakhht . . .                        | . . . nâghukht . . .                  |            |
| illness . . .                   | bimâri . . .                          | P. bemâri . . .                       | P.         |
| to impinge, to brush . . .      |                                       |                                       |            |
| against . . .                   | shtrakh-n . . .                       | . . . turft-ao . . .                  |            |
|                                 | shtrakh-am . . .                      | . . . turf-am . . .                   |            |
|                                 | shtrakht-am . . .                     | . . . turft-am . . .                  |            |
|                                 | shtrakhetk . . .                      | . . . turfj . . .                     |            |
| in . . .                        | pa ———, . . .                         | . . . pa ———, ——— darün . . .         |            |
| incomplete . . .                | chelâ . . .                           | T. chelâ . . .                        | T.         |
| Indian-corn (not grown . . .    |                                       |                                       |            |
| in W. and S.) . . .             | ķonâķ . . .                           | T. ķonâķ . . .                        | T.         |
| an infant, a child . . .        | zah . . .                             | . . . bachah . . .                    | P.         |



|                                                                         | <i>Wakhí.</i>                                                                |       | <i>Sarikolí.</i>                                                              |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------|
| in order to . . .                                                       | ar . . .                                                                     |       | ar                                                                            |
| inside . . .                                                            | pa ——— döst . . .                                                            |       | —pa darün, pa—darün                                                           |
| to intend, to resolve . . .                                             | kasd khàk . . .                                                              | A. W. | kasd cheigao . . .                                                            |
| interest, usury . . .                                                   | jazânàh . . .                                                                |       | jazânàh . . .                                                                 |
| the interior . . .                                                      | döst . . .                                                                   |       | dârün . . .                                                                   |
| intermixedly . . .                                                      | nièr . . .                                                                   |       | aralâsh . . .                                                                 |
| (interrogative affix) . . .                                             | ——— â . . .                                                                  |       | ——— â . . .                                                                   |
| to introduce, to bring <i>or</i><br>take in, to cause to<br>enter . . . | chirmüv-n . . .<br>chermüv-am . . .<br>chermovd-am . . .<br>chermüvetk . . . |       | duwâst-ao . . .<br>duwâdh-am . . .<br>duwüst-am . . .<br>duwüstj . . .        |
| iron . . .                                                              | ishn . . .                                                                   |       | spin . . .                                                                    |
| cast iron . . .                                                         | chuyün . . .                                                                 |       | chuyün . . .                                                                  |
| an island in the midst of<br>a stream . . .                             | jingalak . . .                                                               | P.    | arâlchâh . . .                                                                |
| to isolate . . .                                                        | wî'r khàk . . .                                                              |       | iw'j cheigao . . .                                                            |
| to itch . . .                                                           | gorosh tseràkk . . .                                                         |       | dhjokhht-ao . . .<br>dhjokhh-am . . .<br>dhjekhht-am . . .<br>dhjekhhtj . . . |
| <b>J.</b>                                                               |                                                                              |       |                                                                               |
| a jackdaw . . .                                                         | taghanak . . .                                                               |       | târ taghanàk . . .                                                            |
| jade-stone . . .                                                        | kâsh-ghâr . . .                                                              | T. W. | kâsh-tâshi . . .                                                              |
| a jar, a large cup . . .                                                | pil . . .                                                                    |       | chenâk . . .                                                                  |
| the lower jaw . . .                                                     | zanàkhh . . .                                                                |       | zangân . . .                                                                  |
| to be jealous . . .                                                     | arish khàk . . .                                                             |       | arish cheig-ao . . .                                                          |
| jealousy . . .                                                          | arish . . .                                                                  |       | arish . . .                                                                   |
| to jog . . .                                                            | daḡüv-n . . .<br>daḡüv-am . . .<br>daḡovd-am . . .<br>daḡüvetk . . .         |       | wakucht-ao . . .<br>wakoeh-am . . .<br>wakucht-am . . .<br>wakuchtj . . .     |
| to join, to unite . . .                                                 | katti khàk . . .                                                             |       | katti cheig-ao . . .                                                          |
| a joint, a soldering . . .                                              | kafshir . . .                                                                |       | kafkheir . . .                                                                |
| a joint, articulation . . .                                             | band . . .                                                                   |       | band . . .                                                                    |
| a joke, a jest . . .                                                    | shtik . . .                                                                  |       |                                                                               |
| to jostle . . .                                                         | sukh-n . . .<br>sukh-am . . .<br>sokht-am . . .<br>sukhetk . . .             |       | bezeid-ao . . .<br>bазis-am . . .<br>bazeid-am . . .<br>bazedhj . . .         |





|                              | <i>Wakhí.</i>           | <i>Sarikolí.</i>           |
|------------------------------|-------------------------|----------------------------|
| <b>K.</b>                    |                         |                            |
| Kâshghar . . . .             | Kâshkhhâr . . . .       | Koshkhhâr . . . .          |
| to keep, to hold [to seize]  | wadhûr-an . . . .       | wadhord-ao . . . .         |
| the kernel of a fruit        |                         |                            |
| stone . . . .                | serk . . . .            | rukchi mâghz Y. P.         |
| a key . . . .                | shik . . . .            | âchghu T.                  |
| to kick . . . .              | lûch ding . . . .       | lûch dhâdao . . . .        |
| a kid . . . .                | chôgh . . . .           | ghêrv . . . .              |
| a kidney . . . .             | welk . . . .            | arwits . . . .             |
| to kill, to slay . . . .     | shâ-in . . . .          | zed-ao . . . .             |
|                              | shây-am, shî-t . . . .  | zân-am, zind . . . .       |
|                              | shitt-am . . . .        | zed-am . . . .             |
|                              | shîtk . . . .           | zûdhj . . . .              |
| a Kirghiz tent . . . .       | khhirgâh . . . .        | P. khhergòh P.             |
| to kiss . . . .              | bâ tserâk . . . .       | bâ cheigao . . . .         |
| a kite [bird] . . . .        | tsâr . . . .            | tsârgh* . . . .            |
| the knee . . . .             | brin . . . .            | zùn P.                     |
| to kneel . . . .             | sak brin niüdhn . . . . | chû zùn nalist-ao . . . .  |
|                              |                         | châr zùn nalist-ao . . . . |
| a knife . . . .              | köz . . . .             | chòg . . . .               |
| a knot . . . .               | zerâkh . . . .          | zerekh . . . .             |
| to knot . . . .              | zerâkh ——— ding (to     |                            |
|                              | strike &c.) . . . .     | zerekh — dhâd-ao . . . .   |
|                              | ——— diam . . . .        | dhâ-m . . . .              |
|                              | ——— dikht-am . . . .    | dhâd-am . . . .            |
|                              | ——— dietk . . . .       | dhâdj . . . .              |
| to know . . . .              | dîsh-an . . . .         | wazând-ao, &c. . . .       |
|                              | dîsh-am . . . .         |                            |
|                              | dîst-am . . . .         |                            |
|                              | dîshetk . . . .         |                            |
| <b>L.</b>                    |                         |                            |
| child-bearing labour . . . . | zicha . . . .           | zichâ . . . .              |
| a ladder . . . .             | wakhbâr . . . .         | shattâ T.                  |
| a lady . . . .               | khhanzâh . . . .        | khhanzôh . . . .           |
| a lake, a pool . . . .       | kûl . . . .             | T. kaul T.                 |
| a lamb . . . .               | wurk . . . .            | barqâ . . . .              |

\* Probably for *chargh* P., which has in *Wakhí* become contracted, by the loss of the final guttural, to *tsâr*. In the *Yárkandí* name *sâ* for a kite, we probably have the same Persian word in a form contracted to a still further extent by the loss of the final *r* (which the *Yárkandís* are apt to omit in many of their words), and by the alteration of the Persian *ch* which becomes *ts* in the *Ghalchah* dialects and simple *s* in *Yárkand*. The series of corruptions (*chargh*, *tsârgh*, *tsâr*, *sâ*) is so natural as to suggest the idea that the *Yárkandís* obtained this Persian word through their *Ghalchah* neighbours.



|                                            | <i>Wakhi.</i>     | <i>Sarikoli.</i>       |
|--------------------------------------------|-------------------|------------------------|
| lamb-skin . . .                            | wurk pist . . .   | zer bàst               |
| lame . . .                                 | làng . . .        | lâng P.                |
| lamentation . . .                          | wagh wagh . . .   |                        |
| a lamp . . .                               | chirâgh . . .     | tsirao P.              |
| large, big . . .                           | lup . . .         | laur                   |
| a lark [bird] . . .                        | turghai . . .     | T. turghâi T.          |
| last year . . .                            | pard . . .        | ? P. parwus            |
| of last year . . .                         | pard-üng . . .    | parwus-enj             |
| lasting, strong . . .                      | pürdâsht . . .    | P. pâinug P.           |
| late [adv.] . . .                          | dhösh . . .       | déir P.                |
| late, recent . . .                         | yând-üng . . .    | ingom-enj              |
| lately . . .                               | yând . . .        | ingom                  |
| to laugh . . .                             | kand-âk . . .     | shind-ao               |
|                                            | kand-am . . .     | shând-am               |
|                                            | kandi-am . . .    | shind-am               |
|                                            | kandetk . . .     | shindj                 |
| laughable . . .                            | kandâk-asok . . . | shind-asuk             |
| lazy, slow . . .                           | gahal . . .       | A. kashâng T.          |
| lead [metal] . . .                         | sûrb . . .        | P. kurgashim T.        |
| to lead . . .                              |                   | kutal cheig-ao         |
| a leaf [of a tree] . . .                   | paleh . . .       | pork ( <i>barg</i> P.) |
| lean, emaciated . . .                      | khât . . .        | khut                   |
| to lean against . . .                      | pütrüz-n . . .    | padrâzd-ao             |
|                                            | pütrüz-am . . .   | padrâz-am              |
|                                            | pâtrâz-am . . .   | padrâzd-am             |
|                                            | pütrüzetk . . .   | padrâzdj               |
| to learn . . .                             | yekhk wâtsn . . . | ikhhman setao          |
| leather (not tanned but rubbed soft) . . . | gardagi . . .     | P. parkhao             |
| leave, permission, reply, answer . . .     | juwâb . . .       | juwùb P.               |
| left [hand] . . .                          | châp . . .        | châp P.                |
| left-handed . . .                          | châpaki . . .     | châpaki                |
|                                            | châp dhast        |                        |
| leg, foot . . .                            | püdh . . .        | pedh                   |
| —— (an animal's) . . .                     | lōng . . .        | lang P.                |
| the leg below the knee . . .               | mashin lang . . . | mishin lang            |
|                                            | pâichâh . . .     | pâichâh P. Y.          |
| a white leopard, an ounce . . .            | pös, babr A. . .  | pis                    |
| less (adv.) . . .                          | dzâk-tar . . .    | dzül-dir               |
| to let go, (to put down) . . .             | latsar-an . . .   |                        |
| a lever . . .                              | khirs . . .       | âram ? P.              |





|                                                       | <i>Wakhi.</i>             | <i>Sarikoli.</i>   |       |
|-------------------------------------------------------|---------------------------|--------------------|-------|
| to lick . . . . .                                     | likh-n . . . . .          | dhikt-ao           |       |
|                                                       | likh-am . . . . .         | dhok-am            |       |
|                                                       | likht-am . . . . .        | dhikt-am           |       |
|                                                       | likhetk . . . . .         | dhiktj             |       |
| a lid or cover of a sauce-pan . . . . .               | gàsh-gin . . . . .        | naghàk             |       |
| a lie, an untruth . . . . .                           | durogh . . . . .          | P. fànd            | P.    |
| to lie in ambush . . . . .                            | màlish tseràk . . . . .   | sord-ao            |       |
|                                                       |                           | sur-am             |       |
|                                                       |                           | surd-am            |       |
|                                                       |                           | surdj              |       |
| to lie down, to lie . . . . .                         | nasü-n . . . . .          | alid-ao            |       |
|                                                       | nàsi-am, nisi-t . . . . . | alâs-am, alist     |       |
|                                                       | nast-am . . . . .         | alüid-am           |       |
|                                                       | nasetk . . . . .          | alüidj             |       |
| to cause to lie down, to lay down . . . . .           | nüsiüv-n . . . . .        | aleizând-ao, &c.   |       |
|                                                       | nüsiüv-am                 |                    |       |
|                                                       | nòsiovd-am                |                    |       |
|                                                       | nüsiüvetk                 |                    |       |
| to lift, to raise . . . . .                           | wuch tseràk . . . . .     | tèr cheigao        |       |
| light (in weight), also fast (of a horse) . . . . .   | rànjik . . . . .          | rindz              |       |
| light-coloured (of eyes). . . . .                     | chakir . . . . .          | chakar             |       |
| light, radiance . . . . .                             | voin . . . . .            | vôin               |       |
| to lighten, (lightning) . . . . .                     | bàrkhh ding . . . . .     | bàrkhh dhâdao      |       |
| lightning . . . . .                                   | bàrkhh . . . . .          | bàrkhh             | A.    |
| like that, so, . . . . .                              | hazi, nik-hazi . . . . .  | nikdàs             |       |
| ——— like . . . . .                                    | ——— ràng . . . . .        | ——— ràng           | P.    |
| a line, a score . . . . .                             | chirgh . . . . .          | chighir            |       |
| to line, to cover a garment, &c. with stuff . . . . . | tàsh khshàk . . . . .     | T. W. tàsh tizd-ao | T. S. |
| to draw a line, to score . . . . .                    | chirgh khash-an . . . . . | chighir tizd-ao    |       |
|                                                       | ——— khash-am . . . . .    | ——— tâz-am         |       |
|                                                       | ——— khasht-am . . . . .   | ——— tizd-am        |       |
|                                                       | ——— khashetk . . . . .    | ——— tizdj          |       |
| linseed, flax ( <i>none grown</i> ) . . . . .         | zaghîr . . . . .          | zaghîr             | T.    |
| a lip . . . . .                                       | lafch, lav . . . . .      | pàuz               |       |
| to listen, to give ear . . . . .                      | ghish kat-àk . . . . .    | ghaul wedhd-ao     |       |
|                                                       | ——— kàt-am . . . . .      | ——— wedh-am        |       |
|                                                       | ——— kàrt-am . . . . .     | ——— wedhd-am       |       |
|                                                       | ——— katetk . . . . .      | ——— wedhdj         |       |





|                                                                           | <i>Wakhi.</i>      | <i>Sarikoli.</i>           |
|---------------------------------------------------------------------------|--------------------|----------------------------|
| little, small . . .                                                       | dzaklâi . . .      | dzül . . .                 |
| a little, little (adv.) . . .                                             | dzâk . . .         | dzül . . .                 |
| a very little morsel . . .                                                | timik safk . . .   | dund kik . . .             |
| the liver . . .                                                           | jigâr . . .        | P. thûd . . .              |
| a load . . .                                                              | vür . . .          | wez . . .                  |
| to load . . .                                                             | vür khâk . . .     | dhâkht-ao . . .            |
|                                                                           |                    | dherz-am . . .             |
|                                                                           |                    | dhâkht-am . . .            |
|                                                                           |                    | dhâkhtj . . .              |
| locality, a place . . .                                                   | jâi . . .          | jâi . . . P.               |
| to lodge, to put up (intr.),<br>to pass the night . . .                   | shub'r hâlâk . . . | reid-ao . . .              |
| to cause to lodge, to give<br>a night's lodging, to<br>put up (tr.) . . . | shub'r diivn . . . | khab-ar reizând-ao . . .   |
|                                                                           |                    | —— reizân-am . . .         |
|                                                                           |                    | —— reizând-am . . .        |
|                                                                           |                    | —— reizândj . . .          |
| a log of wood . . .                                                       | kündâh . . .       | kündâh . . . P.            |
| long . . .                                                                | vorz . . .         |                            |
| as long as, as far as, till,<br>during . . .                              | —— batkan . . .    | —— its, tâ —— its . . .    |
| longing, desire . . .                                                     | awâs . . .         | awâs . . .                 |
| to look, to look after . . .                                              | didig-n . . .      | chûkht-ao . . .            |
|                                                                           | didig-am . . .     | châs-am . . .              |
|                                                                           | didigd-am . . .    | chûkt-am . . .             |
|                                                                           | didigetk . . .     | chûkhtj . . .              |
| to look after, to watch . . .                                             | nigah tserâk . . . | P. W. nigah cheig-ao P. S. |
| loose, wide . . .                                                         | farâkh . . .       | P. rûn . . .               |
| to loose . . .                                                            | wûshe-in . . .     |                            |
|                                                                           | wûsh-am . . .      |                            |
|                                                                           | washin-am . . .    |                            |
|                                                                           | wûshetk . . .      |                            |
| to lose . . .                                                             | nûs-an . . .       | binâst-ao . . .            |
|                                                                           | nûs-am . . .       | binâs-am . . .             |
|                                                                           | nâst-am . . .      | binâst-am . . .            |
|                                                                           | nûsetk . . .       | binâstj . . .              |
| to be lost, to disappear . . .                                            | nash-âk . . .      | beid-ao . . .              |
|                                                                           | nâsh-am . . .      | { bis-am . . .             |
|                                                                           | nâsht-am . . .     | { bâst . . .               |
|                                                                           | nashetk . . .      | beid-am . . .              |
|                                                                           |                    | bedhj . . .                |





|                            | <i>Wakhi.</i>     |       | <i>Sarikoli.</i>     |       |
|----------------------------|-------------------|-------|----------------------|-------|
| to lose the way .          | rapats-an .       | .     | nalkhhüd-ao          |       |
|                            | rapits-am } .     | .     | nalkhhäu-am          |       |
|                            | rapats-t } .      | .     | nalkhhüd-am          |       |
|                            | rapagn-am .       | .     | nalkhhüd-am          |       |
|                            | rapàkhk .         | .     | nalkhhüdhj           |       |
| to cause to lose the way,  |                   |       |                      |       |
| to mislead .               | rapetsüv-an .     | .     | nalkhawând-ao        |       |
|                            | rapetsüv-am .     | .     | &c.                  |       |
|                            | rapetsovd-am      |       |                      |       |
|                            | rapetsüvetk       |       |                      |       |
| a louse .                  | shish .           | ? P.  | späl                 |       |
| love .                     | yurung (?)        |       |                      |       |
| to love, (to kiss)         | bà tseràk .       | .     | bà cheigao           |       |
| lucerne grass .            | wujerk .          | .     | bedà                 | T.    |
| lukewarm .                 | narm .            | P.    | shilet               |       |
| lungs .                    | shush .           | P.    | sül                  |       |
| <b>M.</b>                  |                   |       |                      |       |
| a mace .                   | gürz .            | .     | gürz                 | P.    |
| to macerate, to powder .   | dhükhn .          | .     | yüg-ao               |       |
|                            | dhükh-am .        | .     | yân-am               |       |
|                            | dhokht-am .       | .     | yüg-am               |       |
|                            | dhüketk .         | .     | yügj                 |       |
| a cotton-cleaning ma-      |                   |       |                      |       |
| chine .                    | chigharik .       | T.    | chigharik            | T.    |
| mad, a madman .            | liw .             | .     | dhèw                 |       |
| madder ( <i>subst.</i> ) . | urudân .          | .     | araden               |       |
| a magpie .                 | karjöpeh .        | .     | kargopeh             |       |
| a maid, a virgin .         | pür-chodh .       | P.    | gâts                 |       |
| maimed .                   | shâl .            | .     | shâl                 |       |
| to make, to do .           | khàk, gokh-an .   | .     | cheigao              |       |
|                            | { gokh-am, gô-m . | .     | { kan-am             |       |
|                            | { gokh-t .        | .     | { kakh-t (3rd sing.) |       |
|                            |                   |       | { ka-it (2 pl.)      |       |
|                            | gokht-am .        | .     | chaug-am             |       |
|                            | khetsk .          | .     | chaugj               |       |
| to make, to construct .    | sâz khàk .        | P. W. | suz cheigao          | P. S. |
| to make equal (in height)  | rür-an .          | .     | rord-ao              |       |
|                            | rür-am .          | .     | ròr-am               |       |
|                            | rord-am .         | .     | rord-am              |       |
|                            | rüretk .          | .     | rordj                |       |
| male .                     | ghösch .          | .     | nièr                 |       |



|                                                 | <i>Wakhi.</i>               |    | <i>Sarikoli.</i>                        |       |
|-------------------------------------------------|-----------------------------|----|-----------------------------------------|-------|
| a mallet . . .                                  | kütum . . .                 |    | petgâl, kutum                           |       |
| a man "vir," also a hero                        | dhài . . .                  |    | churik                                  |       |
| a man of Yarkand . . .                          | Yàrkandi . . .              |    | khâri ( <i>viz.</i> shahri, a townsman) |       |
| a manger . . .                                  | zarâkhùr . . .              | P. | âkhùr                                   | P.    |
| the mane (of a horse) . . .                     | yâl . . .                   |    | yâl                                     | T.    |
| a mantilla (woman's) . . .                      | chil . . .                  |    | khâdhbun                                |       |
| many, much . . .                                | ghafch . . .                |    | hüch                                    |       |
| how many? how much?                             | tsum . . .                  |    | tsund                                   | P.    |
| a march, a migration . . .                      | kuch . . .                  | P. | kach                                    | P.    |
| a mare . . .                                    | madhâgh . . .               |    | vorz                                    |       |
| a married man, a master of a household . . .    | ketkhhudâh . . .            | P. | ketkhhudâh                              | P.    |
| marrow . . .                                    | sèrk . . .                  |    | muzg                                    |       |
| a marsh ( <i>see</i> mud) . . .                 | khhötin . . .               |    | ghâtin                                  |       |
| massive, thick . . .                            | bâj . . .                   |    | divèz                                   |       |
| a master . . .                                  | sâyib . . .                 | A. | sâhib                                   | A.    |
| to masticate, to munch . . .                    | mâk-an . . .                |    | zghâd-ao                                |       |
|                                                 | mâk-am . . .                |    | zghau-am                                |       |
|                                                 | mâkt-am . . .               |    | zghod-am                                |       |
|                                                 | mâketk . . .                |    | zghodhj                                 |       |
| matter, pus . . .                               | chirk . . .                 | P. | ghònd                                   |       |
| mean, sordid . . .                              | badh-tap (? bad tabi'at P.) |    | ghâzd                                   |       |
| a measure of capacity . . .                     | pimanâ . . .                | P. | païmanâ                                 | P.    |
| to measure . . .                                | chòk khâk or tserâk         |    | chòk cheig-ao                           |       |
| meat . . .                                      | gusht . . .                 | P. | gükht                                   | P.    |
| medicine, a drug . . .                          | dârû . . .                  | P. | dâri                                    | P.    |
| to meet, to encounter . . .                     | dichâr ding . . .           |    | dichâr dhâd-ao                          |       |
| to melt ( <i>intr.</i> ) . . .                  | âb wâtsn . . .              |    | ûb setao                                | P. S. |
| memory, recollection . . .                      | yâd . . .                   | P. | yûd                                     | P.    |
| a merchant, a rich man . . .                    | bâi . . .                   | T. | bâi                                     | T.    |
| merciful-hearted . . .                          | khhâtir bin . . .           | P. | khhâtir bin                             | P.    |
| a merlin (hawk) . . .                           | turungtai . . .             | T. | turungtai                               | T.    |
| midday meal . . .                               | châsht . . .                | P. | tsukht                                  |       |
| the midst, the middle . . .                     | malung . . .                |    | madhân                                  |       |
| middle ( <i>adj.</i> ), intermedi-<br>ate . . . | malung-üng . . .            |    | madhân-enj, madhân-sedbj                |       |
| milk . . .                                      | zarz . . .                  |    | khevd                                   |       |
| thick milk (shortly after<br>calving) . . .     | pikh . . .                  |    | râthch                                  |       |



|                                                                                                                                                                                                                                                                                                                                                                                              | <i>Wakhí.</i>        | <i>Sarikolí.</i>      |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|------|
| to milk . . . .                                                                                                                                                                                                                                                                                                                                                                              | dhits-n . . . .      | dhaud-ao . . . .      |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | dhits-am . . . .     | dhauz-am . . . .      |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | dhögn-am . . . .     | dhaud-am . . . .      |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | dhökhk . . . .       | dhaudj . . . .        |      |
| to give milk freely (of a<br>cow or goat to which<br>the young one is shown)                                                                                                                                                                                                                                                                                                                 | ravir khák . . . .   | ravèr cheigao . . . . |      |
| a mill . . . .                                                                                                                                                                                                                                                                                                                                                                               | khadhòrg . . . .     | khadhòrj . . . .      |      |
| a funnel-shaped feeder<br>of a mill . . . .                                                                                                                                                                                                                                                                                                                                                  | dûr . . . .          | skaun . . . .         |      |
| to mimic . . . .                                                                                                                                                                                                                                                                                                                                                                             | püt müi-n . . . .    | pardhíd-ao . . . .    |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | — müi-am . . . .     | pardhau-am . . . .    |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | — moid-am . . . .    | pardhüd-am . . . .    |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | — müietk . . . .     | pardhedhj . . . .     |      |
| to mince, to cut up . . . .                                                                                                                                                                                                                                                                                                                                                                  | chup-n . . . .       | khevdào . . . .       |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | chup-am . . . .      | kheib-am . . . .      |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | chavd-am . . . .     | khevd-am . . . .      |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | chefk . . . .        | khevdj . . . .        |      |
| mind, heart . . . .                                                                                                                                                                                                                                                                                                                                                                          | püzúv, dil P. . . .  | dil . . . .           | P.   |
| a mine . . . .                                                                                                                                                                                                                                                                                                                                                                               | kân . . . .          | P. kûn . . . .        | P.   |
| mirâge (shadow ?) . . . .                                                                                                                                                                                                                                                                                                                                                                    | sâyà . . . .         | suyâ . . . .          | ? P. |
| a miser . . . .                                                                                                                                                                                                                                                                                                                                                                              | kumus . . . .        | bakhhil . . . .       | A.   |
| to mislead, to cause to<br>lose the way . . . .                                                                                                                                                                                                                                                                                                                                              | rapetsüv-n . . . .   | nalkhawând-ao . . . . |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | rapetsüv-am . . . .  | &c. . . .             |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | rapetsovd-am . . . . |                       |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | rapetsüvetk . . . .  |                       |      |
| to mix, to compound . . . .                                                                                                                                                                                                                                                                                                                                                                  | shind-âk . . . .     | khhirkht-ao . . . .   |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | shând-am . . . .     | khhirkh-am . . . .    |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | shândid-am . . . .   | khhirkht-am . . . .   |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | shöndetk . . . .     | khhirkhtj . . . .     |      |
| month . . . .                                                                                                                                                                                                                                                                                                                                                                                | mûi . . . .          | mâs . . . .           |      |
| <i>Money.</i> —There is no coinage ; that of neighbouring countries is sometimes<br>found, but barter is the usual mode of transacting business,<br>coarse pieces of Yarkand cloth being the standard of value<br>(in dealing with the Kirghiz, grain is the standard). Grain and<br>cattle are cheaper in Wakhân than in Sarikol, or rather Yarkand<br>cloth is dearer in the former place. |                      |                       |      |
| moon . . . .                                                                                                                                                                                                                                                                                                                                                                                 | jümâk . . . .        | mâs . . . .           |      |
| more . . . .                                                                                                                                                                                                                                                                                                                                                                                 | yât . . . .          |                       |      |
| moreover, again . . . .                                                                                                                                                                                                                                                                                                                                                                      | wâz . . . .          | P. wûz . . . .        | P.   |



|                              | <i>Wakhi.</i>    |       | <i>Sarikoli.</i>   |       |
|------------------------------|------------------|-------|--------------------|-------|
| early in the morning         | naghdin          | .     | pigàn, pigàn-ath   | P.    |
| the morning meal             | pizvàn           | .     | pakhik             |       |
| the Morning Star             | karwàn küsh      | P.    | yaulàn zàk         |       |
|                              | (caravan killer) | .     | (dawn star ?)      |       |
| a mosquito                   | pthû             | .     | pasha              | P.    |
| a moth                       | parwànâ          | P.    | parwânâ            | P.    |
| a moth (that eats cloth)     | wich             | .     | kuwâh              |       |
| mother                       | nân              | .     | anâ                | T.    |
| mother-in-law                | khâsh            | .     | khhekhkh           |       |
| a mound, hillock             | bok              | .     | béak               |       |
| a mountain                   | koh              | P.    | téij               |       |
| a mountain stream            | jirâv yupk       | P. W. | darâh khâts        | P. S. |
| to mount, to go up or<br>out | nawûz-an         | .     | nakhtid-ao         |       |
| a mouse                      | pürk             | .     | pürg               |       |
| moustache                    | shâpâr           | .     | bürüt              | T.    |
| a mouth                      | ghâsh            | .     | ghov               |       |
| to move, to shift (intr.)    | töch-n           | .     | ķuzghâl set-ao     | T.    |
|                              | töch-am          | .     |                    |       |
|                              | töcht-am         | .     |                    |       |
|                              | töchetk          | .     |                    |       |
| to move, to shift (tr.)      | tachüv-n         | .     | ķuzghamish cheigao | T.    |
|                              | tachüv-am        | .     |                    |       |
|                              | tachovd-am       | .     |                    |       |
|                              | tachüvetk        | .     |                    |       |
| much (full amount)           | tķi              | .     | pür                | P.    |
| so much, that much           | a-tum            | .     | dund               |       |
| thus much, or many           | ma-tum           | .     | mund               |       |
| mud, clay                    | khhöt            | .     | ghát               |       |
| music                        | sâz              | P.    | sâz                | P.    |
| to make music                | sâz khák         | P. W. | sâz cheig-ao       | P. S. |
| a musical instrument         | doriâ            | T ?   | naghmâ             | P.    |
| musk                         | mushk            | P.    | mukhk              | P.    |
| a mussuk (goat skin)         | dhotsk           | .     | ambân              |       |
| a small do. (kid skin)       | pitvar           | .     | jagbist            |       |
| mustard                      | ķichi            | Y.    | ķichi              | Y.    |
|                              | zarghun*         | .     | zarghun            |       |
| <b>N.</b>                    |                  |       |                    |       |
| naked, bare                  | shilâkh, chand   | .     | chalendâk          |       |

\* Perhaps this is the origin of the Yarkandi word *zaghun* (by the elision of the *r* common in that dialect—rather than *vice versa*).





|                                                             | <i>Wakhi.</i>            |                                         | <i>Sarikoli.</i> |
|-------------------------------------------------------------|--------------------------|-----------------------------------------|------------------|
| name . . . . .                                              | nung . . . . .           | P. nâm . . . . .                        | P.               |
| a napkin, a handkerchief . . . . .                          | rîmâl . . . . .          | P. réimâl . . . . .                     | P.               |
| narrow, tight . . . . .                                     | tang . . . . .           | P. tong . . . . .                       | P.               |
| narrower, tighter . . . . .                                 | tang-tar . . . . .       | P. tong-dèr . . . . .                   | P.               |
| the navel . . . . .                                         | nof . . . . .            | P. vanuj . . . . .                      |                  |
| near (adv.) . . . . .                                       | schikh . . . . .         | . nîzd . . . . .                        | P.               |
| near, by (p.p.) . . . . .                                   | da ——— schikh . . . . .  | . ——— khez . . . . .                    |                  |
| necessaries . . . . .                                       | lâzimi . . . . .         | . lâzimi . . . . .                      | P.               |
| necessary, needful . . . . .                                | lâzim . . . . .          | . lâzim . . . . .                       | P.               |
|                                                             | dar kâr . . . . .        | P. dar kûr . . . . .                    | P.               |
| the neck . . . . .                                          | gardhân . . . . .        | P. gardhân . . . . .                    | P.               |
| a needle . . . . .                                          | sits . . . . .           | . sits . . . . .                        |                  |
| a packing needle . . . . .                                  | jual-duz . . . . .       | . jual-duz . . . . .                    | P.               |
| a neighbour . . . . .                                       | 'am-sâya . . . . .       | P. keshni . . . . .                     | T.               |
| a nephew . . . . .                                          | khilian . . . . .        | . . . . .                               |                  |
| a nest . . . . .                                            | yoth . . . . .           | . rôz . . . . .                         |                  |
| to net (to lay a net) . . . . .                             | tor râst khâk . . . . .  | . tur rust cheigao . . . . .            |                  |
| to net (stitch) [ <i>see to</i><br><i>plait</i> ]. . . . .  | parwuf-n . . . . .       | . parwiftao . . . . .                   |                  |
|                                                             | parwuf-am . . . . .      | . parwâf-am . . . . .                   |                  |
|                                                             | parwâft-am . . . . .     | . parwift-am . . . . .                  |                  |
|                                                             | parwufetk . . . . .      | . parwiftj . . . . .                    |                  |
| new, fresh . . . . .                                        | schögd, tâzâh P. . . . . | . nûj, tuzâh P. . . . .                 |                  |
| news . . . . .                                              | khavar . . . . .         | P. khavar . . . . .                     | P.               |
| to give news . . . . .                                      | khavar katâk . . . . .   | . khavar wedh-ao . . . . .              |                  |
|                                                             | —— kât-am . . . . .      | . —— weidh-am . . . . .                 |                  |
|                                                             | —— kârt-am . . . . .     | . —— wedhd-am . . . . .                 |                  |
|                                                             | —— katetk . . . . .      | . —— wedhdj . . . . .                   |                  |
| night . . . . .                                             | naghd . . . . .          | . khâb ( <i>shab</i> ) . . . . .        | P.               |
| a night-spectre that eats<br>people, a night-mare . . . . . | vâghd . . . . .          | . vòid . . . . .                        |                  |
| nine . . . . .                                              | nào . . . . .            | . nèw . . . . .                         |                  |
| ninetieth . . . . .                                         | toksanao . . . . .       | T. toksanao . . . . .                   | T.               |
| ninety . . . . .                                            | toksan . . . . .         | T. toksan . . . . .                     | T.               |
| ninth . . . . .                                             | nâwao . . . . .          | . nèwao . . . . .                       |                  |
| no . . . . .                                                | nèi . . . . .            | . nâi . . . . .                         |                  |
| a noise, a cry . . . . .                                    | awâgh . . . . .          | P. awuj . . . . .                       | P.               |
|                                                             | sedâ . . . . .           | A. sherfâ . . . . .                     | P.               |
| noon . . . . .                                              | madhûr . . . . .         | . madhor (? madhân<br>· rwâr) . . . . . |                  |
| a nose . . . . .                                            | mis . . . . .            | . nâz . . . . .                         |                  |



|                                      | <i>Wakhi.</i>                                       |    | <i>Sarikoli.</i>                  |    |
|--------------------------------------|-----------------------------------------------------|----|-----------------------------------|----|
| a nose bag . . .                     | tüfräh . . .                                        | P. | tüfräh                            |    |
| not . . .                            | na, ma <i>with Imperative</i> .                     |    | na, ma ( <i>Imp.</i> )            |    |
| there is not, is not . . .           | näst . . .                                          |    | nüst                              | P. |
| now, at this very time . . .         | niv, ha-niv . . .                                   |    |                                   |    |
| O.                                   |                                                     |    |                                   |    |
| an oath . . .                        | kasam . . .                                         |    | kasam                             | A. |
| to obtain, to arrive at . . .        | got-an . . .                                        |    | vîg-ao                            |    |
|                                      | gòt-am . . .                                        |    | varé-am                           |    |
|                                      | gòtt-am . . .                                       |    | vüg-am                            |    |
|                                      | gotetk . . .                                        |    | vügj                              |    |
| odd, not even . . .                  | tâk . . .                                           |    | tûk                               | T. |
| odour, smell, scent . . .            | vûl . . .                                           |    | bào                               |    |
| to offer, to present . . .           | rür-an &c. . .                                      |    | ròrd-ao, &c.                      |    |
| a high official . . .                | sardâr . . .                                        | P. | sardâr                            | P. |
| old . . .                            | khhiyar . . .                                       |    | keno (kohnah)                     | P. |
| an old man . . .                     | bâbâ pirak . . .                                    | P. | abushkâ                           | T. |
| an old woman . . .                   | kampîr . . .                                        | P. | kampîr                            | P. |
| on . . .                             | sak — an, — tsusk, pür                              |    | chû —, — indèr                    |    |
| one . . .                            | iw, î . . .                                         |    | iw, î                             |    |
| one-another . . .                    | iman (? <i>for</i> î-yem-an<br>“one with this one”) |    | i-mi'r ( <i>one to this one</i> ) |    |
| one by one . . .                     | ighân ighân . . .                                   |    | igân igân                         | P. |
| wild onions . . .                    | karilghân . . .                                     |    | karilgbân                         |    |
| open . . .                           | hõt . . .                                           |    | hât                               |    |
| to open . . .                        | hõt tserâk . . .                                    |    | hât cheigao                       |    |
| opposite . . .                       | ruparu . . .                                        |    | rubaru                            | P. |
| oppressed, humble . . .              | vardhâkhk . . .                                     |    | vizedhj                           |    |
| order, (goodness) . . .              | bâfi . . .                                          |    | charji                            |    |
| to order, to command . . .           | raméi-n . . .                                       |    | râmâd-ao                          |    |
|                                      | { râmi-am . . .                                     |    | { râmi-am                         |    |
|                                      | { rîmi-t . . .                                      |    | { râmâ-id                         |    |
|                                      | römött-am . . .                                     |    | râmôd-am                          |    |
|                                      | rametk . . .                                        |    | râmôdhj                           |    |
| orderly (good) . . .                 | bâf . . .                                           |    | charj                             |    |
| a personal ornament . . .            | sátk . . .                                          |    | safs                              |    |
| the os coccygis . . .                | dzogdzogh . . .                                     |    | dzugzugh                          |    |
| an otter . . .                       | kamâ . . .                                          | Y. | kamâ                              | Y. |
| an ounce, a white leo-<br>pard . . . | pös . . .                                           |    | pis                               |    |
| outcry, proclamation . . .           | wagh . . .                                          |    |                                   |    |
| outside (adj.) . . .                 | vîch-upg . . .                                      |    | vâch-enj                          |    |



|                                                        | <i>Wakhi.</i> | <i>Sarikoli.</i> |    |
|--------------------------------------------------------|---------------|------------------|----|
| outside of (prep.) .                                   | tsa — vich .  | az — tar vach    |    |
| outside (adv.) .                                       | tar vich .    | tar vach         |    |
| to overflow .                                          | nörösh ding . | tèr dhâd-ao      |    |
| to overtake .                                          | gat-âk .      | frebt-ao         |    |
|                                                        | gât-am .      | fròbs-am         |    |
|                                                        | gâti-am .     | fribt-am         |    |
|                                                        | gatetk .      | fribtj           |    |
| to overthrow, throw<br>down, (a wall &c.) .            | büt-an .      | imbat-ao         |    |
|                                                        | büt-am .      | imbat-am         |    |
|                                                        | bott-am .     | imbatt-am        |    |
|                                                        | bütetk .      | imbatj           |    |
| the Ovis Poli .                                        | vroksh .      | rus              |    |
| — female .                                             | marg .        |                  |    |
| an owl .                                               | küm .         | küm              |    |
| an ox .                                                | druksh .      | khej             |    |
| <b>P.</b>                                              |               |                  |    |
| pace .                                                 | wéyâu .       | wéyâu            |    |
|                                                        | tuk .         | tid              |    |
| well paced, fast .                                     | wéyâwin .     | wéyâwin          |    |
| a paddle .                                             | péi .         | féi              |    |
| a padlock .                                            | schik .       | külf             | P. |
| a pail (wooden) .                                      | talào .       | tàlà             |    |
| to feel pain, <i>also</i> to be<br>angry .             | riz-an .      | dhizd-ao         |    |
|                                                        | riz-am .      | dhiz-am          |    |
|                                                        | rizd-am .     | dhizd-am         |    |
|                                                        | rizetk .      | dhizdj           |    |
| a pair .                                               | jaft .        | jüft             | P. |
| a paling .                                             | chit .        | kushum           |    |
| a panier .                                             | ? var .       |                  |    |
| a parasol .                                            | chatr .       | chatr            | P. |
| to parch <i>or</i> roast grain                         | varesh-n .    | virzd-ao         |    |
|                                                        | varesh-am .   | virz-am          |    |
|                                                        | varesh-t-am . | virzd-am         |    |
|                                                        | vareshetk .   | virz dj          |    |
| parched grain ground<br>into meal. Hind.,<br>"sattu" . | pöst .        | pàkht            | P. |
| parti-coloured .                                       | dhard .       | T. chiël         |    |
| a partner .                                            | ambâz-kar .   | P. urtâk-chi     | T. |





|                                                                                                    | <i>Wakhi.</i>                                                 | <i>Sarikoli.</i>                                              |    |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|----|
| a partridge ( <i>Caccabis pallidus</i> . Hume.)                                                    | chkör                                                         | zaredz                                                        |    |
| a pass (over mountains)                                                                            | wiyin                                                         | weyawun                                                       | ?  |
| to pass through, over, or by; to ford, to traverse, to pass by a fault, to let pass (one's rights) | shökhhs-n<br>shökhhs-am<br>shökhhsst-am<br>shökhhssetk        | narjèd-ao<br>{ narjès-am<br>nàrjas-t<br>narjèd-am<br>narjüdhj |    |
| to cause to pass by                                                                                | shökhhsüv-n<br>shökhhsüv-am<br>shökhhssovd-am<br>shökhhsövetk | narzàmbând-ao<br>narzàmbân-am<br>narzàmbând-am<br>narzàmbândj |    |
| a passer-by                                                                                        | shökhhsn-küzg                                                 | narjèd-ichôz                                                  |    |
| a pasture ( <i>see</i> grass)                                                                      | wushin                                                        | wukhin                                                        |    |
| a patch (in a garment)                                                                             | pshin                                                         | psaun                                                         |    |
| a path, a road                                                                                     | vadhak                                                        | pând                                                          |    |
| patient                                                                                            | poi-nâg                                                       | poi-nuk                                                       | P. |
|                                                                                                    | shov                                                          | shuv                                                          | T. |
| pay, wages                                                                                         | mazd                                                          | muzd                                                          | P. |
| peas                                                                                               | shâkh                                                         | mâkh                                                          |    |
| to peck                                                                                            | nûchk ding                                                    | nûsk dhâdao                                                   |    |
| a peg, a nail                                                                                      | mekhh                                                         | makhh                                                         | P. |
| perception, cognizance                                                                             | darak                                                         | darak                                                         | P. |
| to perforate                                                                                       | serv khâk                                                     | dârz cheigao                                                  |    |
| a person                                                                                           | khhalg                                                        | khhalg                                                        | A. |
| perspiration                                                                                       | khil, arâk A.                                                 | khaidh                                                        |    |
| to perspire                                                                                        | arâk tserâk                                                   | khaidh vasid-ao                                               |    |
| a snow pheasant ( <i>Tetrao-gallus tibetanus</i> )                                                 | khörz                                                         | tsatsà                                                        |    |
| a piece, a portion                                                                                 | chut                                                          | kònd, ghor                                                    |    |
| in pieces (adv.)                                                                                   | chut chut                                                     | kònd kònd                                                     |    |
| to pierce, to split (tr.)                                                                          |                                                               | chafand-ao<br>chafan-am<br>chafand-am<br>chafandj             |    |
| a pig                                                                                              | khüg                                                          | khâug                                                         | P. |
| a pigeon                                                                                           | kibit                                                         | chabâud                                                       | P. |





|                                             | <i>Wakhi.</i>                            |       | <i>Sarikoli.</i>      |       |
|---------------------------------------------|------------------------------------------|-------|-----------------------|-------|
| to pile up, to make up                      |                                          |       |                       |       |
| a fire                                      | yâdh-n                                   | .     | rakhid-ao             |       |
|                                             | yâdh-am                                  | .     | rakhi-am              |       |
|                                             | yâdht-am                                 | .     | rakhid-am             |       |
|                                             | yâdhetk                                  | .     | rakhedbj              |       |
| a pillow                                    | balesh                                   | .     | balâkh                |       |
|                                             | khaval                                   |       |                       |       |
| to pinch                                    | chüch-an                                 | .     | tsirambd-ao           |       |
|                                             | chüch-am                                 | .     | tsiramb-am            |       |
|                                             | chocht-am                                | .     | tsirambd-am           |       |
|                                             | chüchetk                                 | .     | tsirambdj             |       |
| pink                                        | âl                                       | T.    | ûl                    | T.    |
| a pit                                       | gilets                                   | .     | kârs                  |       |
| a pitcher                                   | lut                                      | .     | let                   |       |
| a pitch-fork                                | bun                                      | .     | skâun                 |       |
| a place, locality                           | jâi                                      | P.    | jâi                   | P.    |
| a place covered with stones, like a moraine | ghor                                     | .     | ķurum                 | T.    |
| a watering place                            | yupk jâi                                 | W. P. | khökh-tuj             |       |
| a plague                                    | ghumâr (? for <i>ghubâr</i> "vapour" A.) | .     | kasal                 |       |
| a plain (in an angle of a river)            | toká                                     | .     | tokai                 | T.    |
| to plait, to weave                          | wuf-n                                    | .     | wift-ao               |       |
|                                             | wuf-am                                   | .     | waf-am                |       |
|                                             | woft-am                                  | .     | wift-am               |       |
|                                             | wufetk                                   | .     | wiftj                 |       |
| to plaster                                  | lawâk khâk                               | .     | lawâk cheigao         |       |
| a platform or raised ground                 | râz                                      | .     | nokhh                 |       |
| to please                                   | khush khâk                               | P. W. | khûsh cheigao         | P. S. |
| to be pleased with                          | lâik khak                                | A. W. | yerâr cheig-ao (? T.) | S.    |
| a plough                                    | spundr                                   | .     | spur                  |       |
| a plunderer                                 | karakchi                                 | T.    | alamûn                | T.    |
| a plundering raid                           | gharât                                   | P.    | bûlân                 | T.    |
| to plunge, to dip oneself                   | ghot yit-n                               | P. W. | ghût khig-ao          | P. S. |
| a pocket                                    | yijib                                    | ? P.  | yenjiëk               | T.    |
| a poem, poetry                              | makâm-i-bâit                             | A.    | makûm-i-béit          | A.    |
| a point                                     | mis ( <i>nose</i> )                      | .     | nâul                  |       |
| to poke                                     | farnets ding                             | .     | ket dhâdao            |       |
|                                             | &c.                                      |       | &c.                   |       |



|                                   | <i>Wakhí.</i>            |       | <i>Sarikoli.</i>      |       |
|-----------------------------------|--------------------------|-------|-----------------------|-------|
| a police official                 | mir-shab                 | P.    | ķurbàshi              | T.    |
| a pool                            |                          |       | kaul                  | T.    |
| poor, indigent                    | nâ-murâd                 | P. A. | nâ-murâd              | P. A. |
| a poplar                          | tirak                    |       | tirâk                 | T.    |
|                                   | toghrâķ                  |       | toghrâķ               | T.    |
| posteriors                        | tamshîn                  |       |                       |       |
| potash                            | shâķor                   |       | shakhhor              | P.    |
| to pound (into powder)            | pâlm khâk                |       | pâdhm cheig-ao        |       |
| to pound, to beat                 | chûk-n                   |       | chakt-ao              |       |
|                                   | chûk-am                  |       | chak-am               |       |
|                                   | chûkt-am                 |       | chakt-am              |       |
|                                   | chûketk                  |       | chaktj                |       |
| to pour                           | kat-âk                   |       | wiêdh-d-ao            |       |
|                                   | kât-am                   |       | &c.                   |       |
|                                   | kârt-am                  |       |                       |       |
|                                   | katetk                   |       |                       |       |
| to powder, to macerate            | dhûkh-n                  |       | yûg-ao                |       |
|                                   | dhûkh-am                 |       | yân-am                |       |
|                                   | dhòkht-am                |       | yûg-am                |       |
|                                   | dhûketk                  |       | yûgj                  |       |
| power, strength                   | kûch                     |       | kûch                  | T.    |
| powerful, strong                  | kûchîn                   |       | kûchîn                | T.    |
| small-pox                         | spragh ( <i>flower</i> ) |       | gûl ( <i>flower</i> ) | P.    |
| to praise                         | sto-an or sitao-an       |       | stâud-ao              |       |
|                                   | sto-am or sitao-am       |       | stâu-am               |       |
|                                   | stod-am or sitaod-am     |       | stâud-am              |       |
|                                   | stowetk or sitaotk       |       | stâudj                |       |
| precipitous                       | parian                   |       | pariend               |       |
| pregnant (of women)               | dijân                    |       | garim pûi             |       |
| „ , with young (of animals)       | varenj                   |       | varinz                |       |
| prepared, ready                   | shâi                     |       | shâi                  | T.    |
| presence                          | prût, shikh              |       | prod, prut, khez      |       |
| a present, a keep-sake            | samghot                  |       | samghut               | ? P.  |
| to present, to offer, (to extend) | rûr-an                   |       | ròrd-ao               |       |
|                                   | rûr-am                   |       | ròr-am                |       |
|                                   | rort-am                  |       | ròrd-am               |       |
|                                   | rûretk                   |       | ròrdj                 |       |
| to press, to grasp                | trânj-an                 |       | waghrakht-ao          |       |
|                                   | trânj-am                 |       | waghréig-am           |       |
|                                   | trânj-d-am               |       | waghrakht-am          |       |
|                                   | trâkhhk                  |       | waghrakhtj            |       |



|                                                                                                                                  | <i>Wakhi.</i>           |       | <i>Sarikoli.</i>     |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------|----------------------|
| to press down . . .                                                                                                              | vardhenz-n . . .        |       | vizid-ao             |
|                                                                                                                                  | vardhenz-am . . .       |       | vizin-am, vizan-d    |
|                                                                                                                                  | vardhegn-am . . .       |       | vizid-am             |
|                                                                                                                                  | vardhàkhk . . .         |       | vizedhj              |
| price . . .                                                                                                                      | wagh . . .              |       |                      |
| to prick, to stab . . .                                                                                                          | khhalà ding . . .       | P. W. | khhallà dhâdao P. S. |
| to prick its ears (of a horse) . . .                                                                                             | kürr khàk . . .         |       | kürr cheigao         |
| print (chintz) . . .                                                                                                             | chit . . .              |       | chit (? English)     |
| a proclamation . . .                                                                                                             | suran . . .             | T.    | ulam A.              |
| to profit, to affect, to stain . . .                                                                                             | nadhevs-an . . .        |       | nâdhevd-ao           |
|                                                                                                                                  | nadhevs-am . . .        |       | nâdhivs-am           |
|                                                                                                                                  | nadhevd-am . . .        |       | nâdhavs-t            |
|                                                                                                                                  | nadhâfk . . .           |       | nâdhevd-am           |
|                                                                                                                                  |                         |       | nâdhevdj             |
| a prop, a support . . .                                                                                                          | takià . . .             | A.    | baleik               |
| to prop . . .                                                                                                                    | takià diin (ding) . . . |       | baleik dhâdao        |
| propitious (right-hand) . . .                                                                                                    | râst . . .              |       | khheiz               |
| to be prostrated, to be exhausted . . .                                                                                          | sest wâtsn . . .        |       | süst setao           |
| to prove, to try . . .                                                                                                           | âzmud tseràk . . .      | P.    | âzmüd cheigao P.     |
| a proverb, a tale . . .                                                                                                          | zindàg . . .            |       | saug                 |
| provisions, supplies . . .                                                                                                       | zàu . . .               |       | zàu                  |
| to pucker up, to become puckered . . .                                                                                           | ghört wâtsn . . .       |       | wikhj setao          |
| to pull, to draw (in several senses), viz. to drag, to draw lines, also to pull tobacco, i. e. to smoke, also to transport . . . | khâsh-àk . . .          | P.    | tizd-ao              |
|                                                                                                                                  | khâsh-am . . .          |       | tâz-am               |
|                                                                                                                                  | khâsht-am . . .         |       | tizd-am              |
|                                                                                                                                  | khâshetk . . .          |       | tizdj                |
|                                                                                                                                  | yerr . . .              |       | rûj                  |
| the pulse . . .                                                                                                                  | skön . . .              |       | chukhh               |
| a puppy . . .                                                                                                                    | wânj ding . . .         |       | darûn det-ao         |
| to purge . . .                                                                                                                   | zatran khàk . . .       |       | zatran cheig-ao      |
| to pursue, to follow . . .                                                                                                       | chirk . . .             | P.    | ghònd                |
| pus, matter . . .                                                                                                                |                         |       |                      |





|                                                   | <i>Wakhi.</i>                                                 | <i>Sarikoli.</i>                                                   |
|---------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------|
| to put, to place                                  | latsér-n<br>latser-am<br>lakart-am<br>lakartk                 | lachéig-ao<br>lak-am<br>lachaug-am<br>lachaugj                     |
| to put by                                         | bösh diiv-n<br>—— diiv-am<br>—— diôvd-am<br>—— diivetk        | bakh dhaiând-ao<br>—— dhaiân-am<br>—— dhaiând-am<br>—— dhaiândj    |
| to put on (clothes), to<br>dress (oneself)        | pamets-an<br>{ pamets-am<br>{ pamest<br>pamagn-am<br>pamakhk  | pameig-ao<br>{ paméz-am<br>{ pamiz-d<br>pamaug-am<br>pamaugj       |
| to put on horseback                               | sowâr khàk                                                    | P. W. suwûr cheigao P. S.                                          |
| to put in pieces, to di-<br>vide small            | zest khàk                                                     | rezâh cheig-ao                                                     |
| to put up (intr.), to lodge,<br>to pass the night | shub'r hàlàk                                                  | khâb-ar réid-ao                                                    |
| to cause to put up, to give<br>a night's lodging  | shub'r diivn                                                  | khâb-ar réizând-ao<br>—— réizân-am<br>—— réizând-am<br>—— réizândj |
| to put in the proper place,<br>to set in order,   | sak jâi latsarn<br>—— latsar-am<br>—— lakart-am<br>—— lakartk | chü jâi lacheig-ao<br>—— lak-am<br>—— lachaug-am<br>—— lachaugj    |
| to putrify, to rot                                | pitk wâtsn                                                    | pîd-ao<br>pây-am<br>pûd-am<br>pedhj                                |
| a quagmire                                        | ghót<br>shinâp                                                | ghât<br>ghât-in                                                    |
| a quail                                           | wolch                                                         | badanâh                                                            |
| to quake                                          | tap-n<br>tap-am<br>tapt-am<br>tapetk                          | malikḡas cheigáo                                                   |
| a quarrel, a tumult                               | ghâsh                                                         | ghâsh                                                              |



|                                                    | <i>Wakhi.</i>           |    | <i>Sarikoli.</i>   |    |
|----------------------------------------------------|-------------------------|----|--------------------|----|
| to quarrel . . .                                   | ghâsh katâk . . .       |    | ghâsh wedhdao      |    |
| a quarrelsome person . . .                         | ghâsh katâk-kûzg . . .  |    | ghâsh-kûn          |    |
| quarters, camp, also a household . . .             | qosh . . .              | T. | kushûm             | T. |
| to quench one's thirst . . .                       | takhhi shkûdh-n . . .   |    | tûri varâkht-ao    |    |
|                                                    | —— shkôn-am . . .       |    | —— varâl-am        |    |
|                                                    | —— shkônd-am . . .      |    | —— varâkht-am      |    |
|                                                    | —— shkông . . .         |    | —— varâkhtj        |    |
| to quench another's thirst, to give to drink . . . | takhhi shkadhûv-n . . . |    | turi varâkhtând-ao |    |
|                                                    | —— shkadhûv-am . . .    |    | —— varezân-am      |    |
|                                                    | —— shkadhovd-am . . .   |    | —— varezând-am     |    |
|                                                    | —— shkadhûvetk . . .    |    | —— varezândj       |    |
| quickly . . .                                      | jald . . .              | P. | jald               | P. |
| more quickly . . .                                 | jald-tar . . .          | P. | jald-dêr           | P. |
| quicksilver . . .                                  | sim-âv . . .            | P. | sim-uv             | P. |
| to quiet, to appease . . .                         | shov khâk . . .         |    | shuv cheigao       |    |
| to become quiet . . .                              | shov wâtsn . . .        |    | shuv setao         |    |
| to quilt . . .                                     | sirekh khhashâk . . .   |    | siregh tîzd-ao     |    |
| <b>R.</b>                                          |                         |    |                    |    |
| radiance, light . . .                              | voin . . .              |    | vôin               |    |
| a rag . . .                                        | lok . . .               |    | tsaul              |    |
| rain . . .                                         | wûr . . .               |    | waréij             |    |
| a ram . . .                                        | ghösch mâi . . .        |    | nier mâul          |    |
|                                                    | wâr . . .               |    | wiérn              |    |
| to ram in . . .                                    | lûdh-an . . .           |    | tambd-ao           |    |
|                                                    | lûdh-am . . .           |    | tamb-am            |    |
|                                                    | lotht-am . . .          |    | tambd-am           |    |
|                                                    | lûdhetk . . .           |    | tambdj             |    |
| a rat or mouse . . .                               | pürk . . .              |    | pürg               |    |
| rations . . .                                      | sheilân . . .           | T. | sheilân            | T. |
| a raven . . .                                      | shönd . . .             |    | khhèrn             |    |
| a ravine, a gorge . . .                            | dhôr . . .              |    | dhèr               |    |
|                                                    | jirâv . . .             |    | darâh              | P. |
| a razor . . .                                      | tiêgh . . .             | P. | pâki               | T. |
| to reach, to attain . . .                          | parvain . . .           |    | bizeïd-ao          |    |
| to read, to say, to repeat . . .                   | jöin . . .              |    | khòid-ao           |    |
| ready of speech . . .                              | ushyâr . . .            | P. | chechân            | T. |
| to reap . . .                                      | drû-n . . .             |    | tsid-ao            |    |
|                                                    | drâw-am, drît . . .     |    | tsèy-am            |    |
|                                                    | drett-am . . .          |    | tsid-am            |    |
|                                                    | dretk . . .             |    | tsedhj             |    |



|                                               | <i>Wakhi.</i>       |       | <i>Sarikoli.</i> |       |
|-----------------------------------------------|---------------------|-------|------------------|-------|
| the rear, the back part .                     | tsibàs .            | .     | zaboh            |       |
| to receive, to find, to obtain .              | götàk .             | .     | vîg-ào           |       |
|                                               | gôt-am .            | .     | varé-am          |       |
|                                               | gòtt-am .           | .     | vüg-am           |       |
|                                               | gotetk .            | .     | vügj             |       |
| to recognise .                                | pazdan .            | .     | padzând-ào       |       |
|                                               | pāzdan-am .         | .     | padzân-am        |       |
|                                               | pazdand-am .        | .     | padzând-am       |       |
|                                               | pazdanetk .         | .     | padzândj         |       |
| to recollect, to bring to mind .              | tar yâd wüzüm-n     | .     | tar yûd veig-ao  |       |
| recollection, memory .                        | yâd .               | P.    | yûd              | P.    |
| to be reconciled, to become friends, .        | âsht wâtsn          | P. W. | ukht setao       | P. S. |
| to recover (from illness)                     | séhat wâtsn         | A. W. | séhat setao      | A. S. |
| red .                                         | sökr .              | .     | rüsht            |       |
| a reed .                                      | ķamish .            | T.    | ķamush           | T.    |
| refuse .                                      | repk .              | .     | akhlat           | A.    |
| regretful .                                   | pūsheimân .         | P.    | pūkhéimân        | P.    |
| reins .                                       | jilao .             | .     | jilao            |       |
| related in the 1st degree (brothers german) . | vrütîn .            | .     | vrador           |       |
| a relation .                                  | khish .             | P.    | khheikh          | P.    |
| to release, to free .                         | khhalàs khàk .      | .     | khhalùs cheigao  | P.    |
| to remain over .                              | bōsh ding .         | .     | bakh dhâd-ao     |       |
| to remain .                                   | warech-n or wara-in | .     | réid-ao          |       |
|                                               | warich-am .         | .     | { ris-am         |       |
|                                               |                     | .     | { ras-t          |       |
|                                               | waregn-am .         | .     | reid-am          |       |
|                                               | warekbg .           | .     | redhj            |       |
| a remainder .                                 | ķâr .               | ? T.  | ķûr              | T.    |
| a remedy .                                    | chârà .             | P.    | chârà            | P.    |
| to remove, to cause to go away .              | châwüv-n .          | .     | tadzând-ao       |       |
|                                               | chawüv-am .         | .     | tadzân-am        |       |
|                                               | chawoyd-am .        | .     | tadzând-am       |       |
|                                               | chawüvetk .         | .     | tadzândj         |       |
| renowned .                                    | dangi .             | .     | dangi            | ? T.  |
| a rest-house .                                | rabât .             | T.    | rabût            | T.    |



|                                                                     | <i>Wakhi.</i>                                      |   | <i>Sarikoli.</i>                      |       |
|---------------------------------------------------------------------|----------------------------------------------------|---|---------------------------------------|-------|
| to retrovert, to force back                                         | toṽ tserāk .                                       | . | tipt-ao<br>tâb-am<br>tipt-am<br>tiptj |       |
| to return, to turn back .                                           | pshé-in .                                          | . | wāzevd-ao                             |       |
|                                                                     | pshin-am, or { pshéw-<br>am,<br>pshit }            | . | wāzevs-am                             |       |
|                                                                     | pshett-am .                                        | . | wāzevd-am                             |       |
|                                                                     | pshetk .                                           | . | wāzevdj                               |       |
| a social re-union .                                                 | mâilis .                                           | . | A. mâilis                             |       |
| to revolve, to rotate .                                             | gîr-an .                                           | . | P. ghêrd-ao                           |       |
|                                                                     | gîr-am .                                           | . | ghîrs-am                              |       |
|                                                                     | gîrd-am .                                          | . | ghêrd-am                              |       |
|                                                                     | gîretk .                                           | . | ghêrdj                                |       |
| to cause to revolve or rotate .                                     | gîriv-an .                                         | . | gherând-ao                            |       |
|                                                                     | gîriv-am .                                         | . | ghêrân-am                             |       |
|                                                                     | gîrovd-am .                                        | . | ghêrând-am                            |       |
|                                                                     | gîrivetk .                                         | . | ghêrândj                              |       |
| a rib .                                                             | pûrs .                                             | . | pâlâ                                  |       |
| rice in the husk (not grown in those valleys) .                     | shâl P., grünj T.                                  | . | shâl                                  | P.    |
| a rich man, a merchant .                                            | bâi .                                              | . | T. bâi                                | T.    |
| to ride .                                                           | { vidhé-in<br>vidhâw-am<br>vidhett-am<br>vidhetk } | . | { suwur setao                         | P. S. |
| riding animal, a "mon-<br>ture" .                                   | wulâgh .                                           | . | T. walugh                             | T.    |
| a ridge .                                                           | ķir .                                              | . | T. ķir                                | T.    |
| right (hand), hence suc-<br>cessful, propitious, also<br>straight . | râst .                                             | . | P. khheiz                             |       |
| to set right .                                                      | bâf khâk .                                         | . | rûst cheigao                          |       |
| rind (of fruit) .                                                   | shpâk .                                            | . | shûpâk                                |       |
| a ring .                                                            | pulangusht .                                       | . | P.                                    |       |
| to ring, to resound .                                               | jiringâs khâk .                                    | . | jiring cheig-ao                       |       |
| to rinse (cups or clothes)                                          | purû-n .                                           | . | parod-ao                              |       |
|                                                                     | puru-am .                                          | . | paro-am                               |       |
|                                                                     | pòrod-am .                                         | . | parod-am                              |       |
|                                                                     | puruetk .                                          | . | parodhj                               |       |





|                                                 | <i>Wakhi.</i>                                      |      | <i>Sariqoli.</i> |      |
|-------------------------------------------------|----------------------------------------------------|------|------------------|------|
| to rip up a seam                                | riz-n . . .                                        |      | raod-ao          |      |
|                                                 | rîz-am . . .                                       |      | raoz-am          |      |
|                                                 | rôzd-am . . .                                      |      | raod-am          |      |
|                                                 | rizetk . . .                                       |      | raodj            |      |
| a river . . .                                   | daryâ . . .                                        |      | daryâ            | P.   |
| a river beach (gravel<br>bed) . . .             | sangov . . .                                       |      | sangôv           |      |
| a road, a path . . .                            | vadhak . . .                                       |      | pând             |      |
| to roast <i>or</i> parch grain, .               | varesh-n . . .                                     |      | virzd-ao         |      |
| to fry . . .                                    | varesh-am . . .                                    |      | virz-am          |      |
|                                                 | varesh-t-am . . .                                  |      | virzd-am         |      |
|                                                 | vareshetk . . .                                    |      | virzdj           |      |
| a fur robe . . .                                | karast . . .                                       |      | warbân           |      |
| an outer robe . . .                             | chapân . . .                                       | T.   | châpân           | T.   |
| a rod . . .                                     | shôpk . . .                                        |      | khëib            |      |
| to roll (intr.) . . .                           | wul wâtsn . . .                                    |      | wul set-ao       |      |
| to roll (tr.) . . .                             | wul tserâk . . .                                   |      | wul cheig-ao     |      |
| to roll up, to wind . . .                       | zwaï-n . . .                                       |      | zerwid-ao        |      |
|                                                 | zwây-am . . .                                      |      | zerwey-am        |      |
|                                                 | zwett-am . . .                                     |      | zerwid-am        |      |
|                                                 | zwetk . . .                                        |      | zerwedhj         |      |
| a roller . . .                                  | ghaltak . . .                                      | P. ? | ghultak          | P. ? |
| a root-filament . . .                           | wâdhn . . .                                        |      | yildiz           | T.   |
| rope . . .                                      | shivan . . .                                       |      | vûkh             |      |
| to rot, to putrify . . .                        | pitk wâtsn . . .                                   |      | pîd-ao           |      |
|                                                 |                                                    |      | pây-am           |      |
|                                                 |                                                    |      | pûd-am           |      |
|                                                 |                                                    |      | pedhj            |      |
| rotten, putrid . . .                            | pitk . . .                                         |      | pedhj            |      |
| round . . .                                     | peṭ . . .                                          |      | puṭ              |      |
| to rub, to stroke . . .                         | dhast ding ( <i>to strike the<br/>hand</i> ) . . . |      | dhüst dhâd-ao    |      |
| to rub to powder be-<br>tween the fingers . . . | vizam-n . . .                                      |      | vizâmd-ao        |      |
|                                                 | vizam-am . . .                                     |      | vizâmb-am        |      |
|                                                 | vizamd-am . . .                                    |      | vizâmd-am        |      |
|                                                 | vizametk . . .                                     |      | vizâmdj          |      |
| to rub up (paint, &c.)<br>in water . . .        | shündâk . . .                                      |      | shîpt-ao         |      |
|                                                 | shând-am . . .                                     |      | shâb-am          |      |
|                                                 | shânddi-am . . .                                   |      | shîpt-am         |      |
|                                                 | shündetk . . .                                     |      | shîptj           |      |





|                                  | <i>Wakhi.</i>           |      | <i>Sarikoli.</i>         |       |
|----------------------------------|-------------------------|------|--------------------------|-------|
| a rug . . . . .                  | palàs . . . . .         | P.   | palus . . . . .          | P.    |
| to ruin, to spoil . . . . .      | wéirân tseràk . . . . . |      | wéirun cheigao . . . . . | P. S. |
| rumour, report . . . . .         | dang . . . . .          | T. ? | dong . . . . .           | T. ?  |
| to run . . . . .                 | göfs-an . . . . .       |      | zokht-ao . . . . .       |       |
|                                  | göfs-am . . . . .       |      | zôz-am . . . . .         |       |
|                                  | göfst-am . . . . .      |      | zokht-om . . . . .       |       |
|                                  | göfsetk . . . . .       |      | zokhtj . . . . .         |       |
| a rush (kind of grass) . . . . . | kirir . . . . .         |      | shüdh . . . . .          |       |
| rust . . . . .                   | zangâr . . . . .        | P.   | tot . . . . .            |       |

## S.

|                                     |                         |    |                         |    |
|-------------------------------------|-------------------------|----|-------------------------|----|
| a coarse sack . . . . .             | taghâr . . . . .        | T. | ghâun . . . . .         |    |
| a saddle . . . . .                  | pödhñ . . . . .         |    | bidhân . . . . .        |    |
| a saddle-bag . . . . .              | . . . . .               |    | khurjin . . . . .       |    |
| sake . . . . .                      | jinib . . . . .         |    | ivon . . . . .          |    |
| säliva . . . . .                    | tuf . . . . .           | T. | tü . . . . .            | T. |
| salt . . . . .                      | nimak . . . . .         | P. | namadhj . . . . .       | P. |
| salt (adj.) . . . . .               | nimakîn . . . . .       |    | namadhjin . . . . .     |    |
| this same, this very . . . . .      | ha-yem . . . . .        |    | nik-yam . . . . .       |    |
| sand . . . . .                      | leiwârch . . . . .      |    | chush . . . . .         |    |
| to satiate . . . . .                | setk khâk . . . . .     |    | sèir chéigao . . . . .  |    |
| satiated . . . . .                  | setk . . . . .          |    | séir . . . . .          | P. |
| to be satiated . . . . .            | setk wâtsn . . . . .    |    | sèir setao . . . . .    |    |
| savoury, sweet . . . . .            | khhuẓg . . . . .        |    | khhèg . . . . .         |    |
| a saw . . . . .                     | harrâh . . . . .        |    | harrâh . . . . .        | P. |
| to say . . . . .                    | khan-âk . . . . .       |    | levd-ao . . . . .       |    |
|                                     | khân-am . . . . .       |    | lev-am . . . . .        |    |
|                                     | khâtt-am . . . . .      |    | levd-am . . . . .       |    |
|                                     | khanetk . . . . .       |    | levdj . . . . .         |    |
| to say (prayers), to read . . . . . | jöñ . . . . .           |    | khòid-ao . . . . .      |    |
|                                     | jòy-am . . . . .        |    | khûy-am . . . . .       |    |
|                                     | jòid-am . . . . .       |    | khòid-am . . . . .      |    |
|                                     | jòyetk . . . . .        |    | khòidj . . . . .        |    |
| a scabbard, a sheath . . . . .      | nadhün . . . . .        |    | ghaluf . . . . .        | P. |
| a scar . . . . .                    | tófch, turtuk . . . . . | T. | túfch, tartik . . . . . | T. |
| to scare away . . . . .             | pütrüm-n . . . . .      |    | padromd-ao . . . . .    |    |
|                                     | pütrümb-am . . . . .    |    | padromb-am . . . . .    |    |
|                                     | potrombd-am . . . . .   |    | padromd-am . . . . .    |    |
|                                     | pütrümetk . . . . .     |    | padromdj . . . . .      |    |



|                                            | <i>Wakhi.</i>                    |       | <i>Sarikoli.</i>                         |
|--------------------------------------------|----------------------------------|-------|------------------------------------------|
| to score, to draw a line.                  | chirgh khâsh-an .                | .     | chighîr-tizd-ao                          |
|                                            | —— khâsh-am .                    | .     | —— tâz-am                                |
|                                            | —— khâsht-am .                   | .     | —— tizd-am                               |
|                                            | —— khashetk .                    | .     | —— tizdj                                 |
| a scorpion . . .                           | khhur prich .                    | .     | shèr chèrm                               |
|                                            | ( <i>donkey worm</i> ) .         | .     | ( <i>donkey worm</i> )                   |
| to scratch . . .                           | chingâl diin (ding), <i>also</i> | .     | changul <sup>2</sup> dhâdao, <i>also</i> |
|                                            | drûp-n .                         | .     | chîd-ao                                  |
|                                            | drûp-am .                        | .     | châu-am                                  |
|                                            | dropt-am .                       | .     | chüd-am                                  |
|                                            | drûpetk .                        | .     | chüdhj                                   |
| a scratch, a score, a line                 | chîrgh .                         | .     | chighîr                                  |
| to scream, to lament .                     | wâgh-wâgh tserâk                 | .     | wâgh-wâgh cheigao                        |
| the seat of honour (in a<br>company) . . . | raz .                            | .     | nokh                                     |
| to stand security .                        | dastadâr wâtsn .                 | P. W. | kafil setào P. S.                        |
| to see, <i>also</i> to visit .             | wing .                           | .     | wând-ao                                  |
|                                            | wîn-am .                         | .     | wéin-am                                  |
|                                            | wind-am .                        | .     | wând-am                                  |
|                                            | winetk .                         | .     | wândj                                    |
| a seed . . .                               | taghm .                          | .     | tôghm P.                                 |
| to seek, to search .                       | shkûr-n .                        | .     | khkéig-ao                                |
|                                            | shkûr-am .                       | .     | khkâr-am, khkîr-d                        |
|                                            | shkûrd-am .                      | .     | khkaug-am                                |
|                                            | shkûretk .                       | .     | khkaugj                                  |
| seemly, worthy of being<br>seen . . .      | wing-asok .                      | .     | wând-asuk                                |
| to seize, to grasp, to<br>hold . . .       | wadhûr-n .                       | .     | wâdhord-ào                               |
|                                            | wüdhûr-am .                      | .     | wâdhor-am                                |
|                                            | wodhord-am .                     | .     | wâdhord-am                               |
|                                            | wüdhûretk .                      | .     | wâdhordj                                 |
| self . . .                                 | (Nom.) khât .                    | .     | khû                                      |
|                                            | (Gen.) khû .                     | .     |                                          |
|                                            | (Dat.) khât-ar .                 | .     |                                          |
|                                            | (the rest) khât .                | .     |                                          |
| by one's self . . .                        |                                  | .     | khû bath                                 |
| to sell . . .                              | pürüng <i>or</i> pürün           | .     | para dhâdao                              |
|                                            | püründ-am .                      | .     | &c.                                      |
|                                            | párâtt-am .                      | .     |                                          |
|                                            | pürüt-k .                        | .     |                                          |





|                                                  | <i>Wakhi.</i>                                                               | <i>Sarikoli.</i>                                                      |
|--------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------|
| to select, to choose out .                       | lâyak khâk A. S., or<br>yawern .<br>yawar-am .<br>yaward-am .<br>yawaretk . | yarûr cheigao T. S. or<br>sarid-ao<br>sarâu-am<br>sarûd-am<br>saredhj |
| to send .                                        | stûy-an or stûi-n<br>stûy-am .<br>statt-am .<br>statk .                     | bôkht-ao<br>bôz-am<br>bôkht-am<br>bôkhtj                              |
| to send (a person), to<br>order (to go)          | raméin .                                                                    | râmôd-ao                                                              |
| separate .                                       | jedhâh P., bulak T.                                                         | judhoh P.                                                             |
| a serpent, a snake .                             | fuk                                                                         | tafûsk                                                                |
| to set in order, to put<br>in the proper place . | sak jâi latsarn<br>—— latsar-am<br>—— lakart-am<br>—— lakartk               | chû jâi lacheig-ao<br>—— lak-am<br>—— lachaug-am<br>—— lachaugj       |
| seven .                                          | hûb                                                                         | ûvd                                                                   |
| seventy .                                        | yetmish                                                                     | yetmish T.                                                            |
| several .                                        | tsum                                                                        | tsund, chandin P.                                                     |
| to sew .                                         | drôvn<br>drôv-am<br>drâvd-am<br>drâfk                                       | intsivdao<br>intsâv-am<br>intsivd-am<br>intsivdj                      |
| shade, shadow .                                  | sâyâh                                                                       | suyâh P.                                                              |
| to shake .                                       | tâp-an<br>tâp-am<br>tâpt-am<br>tapetk                                       |                                                                       |
| shame .                                          | izâ                                                                         | khajal A.                                                             |
| to shampoo .                                     | mand-âk<br>mând-am<br>mânddî-am<br>mandetk                                  | warmând-ao<br>&c.                                                     |
| sharp .                                          | taghd                                                                       | téid ? P.                                                             |
| a shaving (of wood)                              | pûshtilich                                                                  | tarashâh P.                                                           |
| to shear .                                       | varing<br>varin-am<br>varitt-am<br>varitk                                   | pkhâd-ao<br>pkhâu-am<br>pkhud-am<br>pkhudhj                           |
| a shed, a "machân"                               | yôst                                                                        | kapâ, alajük T.                                                       |



|                                          | <i>Wakhi.</i>                                                 |      | <i>Sarikoli.</i>                                                 |      |
|------------------------------------------|---------------------------------------------------------------|------|------------------------------------------------------------------|------|
| a sheep                                  | măi                                                           |      | măul, mào                                                        |      |
| sheep and goats (flocks)                 | jândâr                                                        | P.   | rezapâi                                                          | P.   |
| a full grown sheep                       | pus                                                           |      | piès                                                             |      |
| a shepherd                               | shpün                                                         | ? P. | ghübün                                                           | ? P. |
| a shelf                                  | rün                                                           |      | rün                                                              |      |
| a shift (woman's)                        | parhân                                                        | P.   | barhân                                                           | P.   |
| to shift (intr.), to move<br>(oneself)   | töch-n<br>töch-am<br>töcht-am<br>töchetk                      |      | ķuzghâl set-ao                                                   | T.   |
| to shift, to move (tr.)                  | tachüv-n<br>tachüv-am<br>tachovd-am<br>tachüvetk              |      | ķuzghamish cheigao                                               | T.   |
| a shirt                                  | yiktâ                                                         |      | yektu                                                            | T.   |
| shore, bank                              | yika                                                          | T.   | kâsh                                                             | ? T. |
| short                                    | kôt                                                           | P.   | küt                                                              | P.   |
| short-sighted                            | malâl                                                         |      | malül                                                            |      |
| a shoulder                               | fiâk, tan                                                     |      | sevd, dâlû                                                       | T.   |
| a shovel                                 | péi, bîl P.                                                   |      | féi, bèil P.                                                     |      |
| to shovel                                | büng<br>bün-am<br>bônd-am<br>bünetsk                          |      | pataod-ao<br>patao-am<br>pataod-am<br>pataodj                    |      |
| to show, to exhibit (to<br>cause to see) | visüv-n<br>visüv-am<br>visovd-am<br>visüvetk                  |      | visând-ao<br>visân-am<br>visând-am<br>visândj                    |      |
| shuttle                                  | rashpük                                                       |      | mâki                                                             |      |
| to shy (as a horse)                      | witrin<br>{ witrin-am<br>{ witritht<br>witritht-am<br>witring |      | intrist-ao<br>{ intrâs-am<br>{ intrist<br>introst-am<br>introstj |      |
| to cause to shy, to frighten             | witriüv-n<br>witriüv-am<br>wotriovd-am<br>witriüvetk          |      | intreisând-ao<br>&c.                                             |      |



*Wakhi.**Sarikoli.*

|                                         |                                                |                                 |             |
|-----------------------------------------|------------------------------------------------|---------------------------------|-------------|
| a side, a flank . . .                   | shunj . . .                                    | khaun                           |             |
| on the further side, be-<br>yond . . .  | yà sar, trà (tar-yà) pür<br>W. P.              | tar wi sar, tar wi pur<br>S. P. |             |
| on the hither side . . .                | tram (tar yem) pür,<br>yem sar                 | tar mi pur, mi sar              |             |
| on what side ? . . .                    | tar kum sar . . .                              | tar kâ sar                      |             |
| a sieve . . .                           | algök . . .                                    | algâk                           | T.          |
|                                         | farakh-biz . . .                               | farak-beiz                      |             |
| to sigh . . .                           | dam ding . . .                                 | dam dhâd-ao                     |             |
| far sighted . . .                       | chöjm-in . . .                                 | tsem-in                         | P.          |
| silence ! be quiet ! . . .              | shov ! . . .                                   | shuv !                          |             |
| silk . . .                              | varshüm ( <i>abrësham</i> P.)                  | varekhüm                        | P.          |
| silken . . .                            | varshüm-in . . .                               | varekhüm-in                     | P.          |
|                                         | torkah . . .                                   | turkâ                           |             |
| silver . . .                            | nukrà . . .                                    | nukrà                           | P.          |
| a sin, an error . . .                   | khatagi . . .                                  | khatôgi                         | P.          |
| to sing . . .                           | chîr-an . . .                                  | chîrd-ao                        |             |
|                                         | chîr-am . . .                                  | chîr-am                         |             |
|                                         | chîrd-am . . .                                 | chîrd-am                        |             |
|                                         | chîretk . . .                                  | chîrdj                          |             |
| to sink . . .                           | ghot yît-n . . .                               | chû bôn dhâdao                  |             |
| a sister . . .                          | khûi . . .                                     | yâkhh                           |             |
| a sister-in-law . . .                   | khhyun ( <i>husband's sis-<br/>ter</i> ) . . . | khâyûn                          |             |
|                                         | khasirz ( <i>wife's sister</i> )               |                                 |             |
| to sit down, to alight . . .            | nüdh-n . . .                                   | nâlist-ao                       |             |
|                                         | nazd-am . . .                                  | nîth-am, nâth-d                 |             |
|                                         | neîn-am . . .                                  | nâlüst-am                       |             |
|                                         | nieng . . .                                    | nâlüstj                         |             |
| to cause to sit down . . .              | nüdhüv-an . . .                                | nâledhând-ao                    |             |
|                                         | nüdhüv-am . . .                                | nâlendhân-am                    |             |
|                                         | nodhovd-am . . .                               | nâledhând-am                    |             |
|                                         | nüdhüvetk . . .                                | nâledhândj                      |             |
| to sit down (of a camel)                | chuk ding . . .                                | chök dhâdao                     | T. W. T. S. |
| to cause (a camel) to<br>sit down . . . | chuk diüvn . . .                               | chök dheyând-ao                 |             |
|                                         | diüv-am . . .                                  | dheyân-am                       |             |
|                                         | diövd-am . . .                                 | dheyând-am                      |             |
|                                         | diüvetk . . .                                  | dheyândj                        |             |
| to sit kneeling . . .                   | sak brîn niüdhn . . .                          | châr zân nalist-ao              |             |
| six . . .                               | shâdh . . .                                    | khhèl                           |             |
| sixty . . .                             | âltmish . . .                                  | âltmish                         | T.          |





|                                                            | <i>Wakhí.</i>                        |       | <i>Sariqolí.</i>     |    |
|------------------------------------------------------------|--------------------------------------|-------|----------------------|----|
| a skin . . .                                               | pist . . .                           | P.    | past . . .           | P. |
| to skin . . .                                              | chökh-an . . .                       |       | kökht-ao . . .       |    |
|                                                            | chökh-am . . .                       |       | kéig-am . . .        |    |
|                                                            | chökht-am . . .                      |       | kakht-am . . .       |    |
|                                                            | chökhetk . . .                       |       | kakhtj . . .         |    |
| a skin (used as a bag) . . .                               | dhotsk . . .                         |       | ambân . . .          |    |
| a skirt . . .                                              | dâman . . .                          | P.    | dûman . . .          | P. |
| a skull-cap . . .                                          | skîdh . . .                          |       | khhâudh . . .        |    |
| the sky . . .                                              | asmân . . .                          | P.    | âsmân . . .          | P. |
| to slander . . .                                           | shâr-n . . .                         | A.    | shord-ao . . .       | A. |
|                                                            | shâr-am . . .                        |       | shôr-am . . .        |    |
|                                                            | shârd-am . . .                       |       | shôrd-am . . .       |    |
|                                                            | shâretk . . .                        |       | shôrdj . . .         |    |
| to cause to slander . . .                                  | shâriv-n . . .                       |       | shârând-ao . . .     |    |
|                                                            | shâriv-am . . .                      |       | shârân-am . . .      |    |
|                                                            | shârovd-am . . .                     |       | shârând-am . . .     |    |
|                                                            | shârivetk . . .                      |       | sharândj . . .       |    |
| slandorous . . .                                           | shar andâz . . .                     | A. P. | shord-ichoz . . .    |    |
| slanting wise . . .                                        | shigard mârs . . .                   |       | chilpiâ . . .        |    |
| a slap . . .                                               | chapât . . .                         | T.    | chapalâ . . .        | T. |
| a slate (used for flat roofs and also for baking on) . . . | sât . . .                            |       | sâd . . .            |    |
| to slaughter (an animal) . . .                             | bismal khâk (to do Bism-Illah) . . . |       | basmal cheigao . . . |    |
| a slave (male) . . .                                       | andag . . .                          |       | indîj . . .          |    |
| — (female) . . .                                           | indigunj . . .                       |       | indijâns . . .       |    |
| slavery, servitude . . .                                   | andagi . . .                         |       | indîji . . .         |    |
| to slay, to kill . . .                                     | shitâr-n . . .                       |       | zéd-ao . . .         |    |
|                                                            | { shâi-am . . .                      |       | { zân-am . . .       |    |
|                                                            | { shî-t . . .                        |       | { zînd . . .         |    |
|                                                            | shitt-am . . .                       |       | zèd-am . . .         |    |
|                                                            | shîtk . . .                          |       | zûdhj . . .          |    |
| a sledge hammer . . .                                      | bâzghan . . .                        |       | bâzghan . . .        | T. |
| sleep . . .                                                | yünük . . .                          |       | khhûdhm . . .        |    |
| to sleep . . .                                             | rûkhüp-n . . .                       |       | khovd-ao . . .       |    |
|                                                            | rûkhp-am, rûkhüp-t . . .             |       | khufs-am . . .       |    |
|                                                            | ròkhòpt-am . . .                     |       | khuvd-am . . .       |    |
|                                                            | rûkhpeth . . .                       |       | khuvdj . . .         |    |
| sleepy, sluggish . . .                                     | nâsün-küzg . . .                     |       | aléid-ichoz . . .    |    |
| a sleeve . . .                                             | dröst . . .                          |       | zül . . .            |    |



|                                                   | <i>Wakhi.</i>            |    | <i>Sarikoli.</i>      |    |
|---------------------------------------------------|--------------------------|----|-----------------------|----|
| slender, thin, (of things)                        | sanâr                    | .  | tanûk                 | P. |
| a slice                                           | .                        | .  | turj                  |    |
| green slime on the sur-<br>face of standing water | ghôb                     | .  | lôsh                  | T. |
| a sling                                           | schkupn                  | .  | vizdoch               |    |
| to slip, to slide                                 | liv-n                    | .  | znôid-ao              |    |
|                                                   | liv-am                   | .  | znûs-am               |    |
|                                                   | livd-am                  | .  | znôid-am              |    |
|                                                   | livetk                   | .  | znôidj                |    |
| to slit, to split                                 | pâgh ding                | .  | pâgh dhâdao           |    |
| a slit                                            | khashetk-üng             | .  | tizj-enj              |    |
| sloping                                           | khîdh-mârs               | .  | padzé-dâs             |    |
| slow, lazy                                        | gahal                    | .  | kashang               | T. |
| small, little                                     | dzaklâj                  | .  | dzül                  |    |
| small pox                                         | spragh ( <i>flower</i> ) | .  | gûl ( <i>flower</i> ) | P. |
| marked with small-pox                             | gilwâr-gin               | .  | chûpâr                |    |
| a smarting (of a wound)                           | gözôk                    | T. | gazâk                 | T. |
| to smear                                          | sûkh-an                  | .  | rift-ao               |    |
|                                                   | sûkh-am                  | .  | rof-am                |    |
|                                                   | sokht-am                 | .  | rift-am               |    |
|                                                   | sûkhetk                  | .  | riftj                 |    |
| a smell (good or bad), a<br>perfume, an odour     | vûl                      | .  | bào                   |    |
| to smell (intr.)                                  | vûl nûwûz-an             | .  | bào nakhtigao         |    |
| to smell (tr.)                                    | vûl tserâk               | .  | bào cheigao           |    |
| smoke                                             | dhît                     | P. | dhüd                  | P. |
| smooth                                            | sudhg                    | .  | sudhg                 |    |
| to sneeze or snort<br>(of a horse or camel)       | ferkhh-an                | .  | ferkhht-ào            |    |
|                                                   | ferkhh-am                | .  | ferkhh-am             |    |
|                                                   | ferkhht-am               | .  | ferkhht-am            |    |
|                                                   | ferkhhetk                | .  | ferkhhtj              |    |
| to sneeze                                         | shtröf-an or pörsh-an    | .  | pürkhtao              |    |
|                                                   | shtröf-am pörsh-am       | .  | pürkham               |    |
|                                                   | shtröft-am pörsht-am     | .  | pürkht-am             |    |
|                                                   | shtröfetk pörshetk       | .  | pürkhtj               |    |
| a sneeze                                          | shtröf                   | .  | pürkham               |    |
| a snore                                           | khurrak                  | T. | khurrak               | T. |
| snow                                              | zam                      | .  | zamân                 |    |
| a snow pheasant (? Tet-<br>raogallus tibetanus)   | khörz                    | .  | tsatsà                |    |
| snowy                                             | zamîn                    | .  | zamânîn               |    |



|                                                                                              | <i>Wakhi.</i>         |      | <i>Sarikoli.</i> |       |
|----------------------------------------------------------------------------------------------|-----------------------|------|------------------|-------|
| so, like that . . .                                                                          | hazi, nik-hazi . . .  |      | nik-dâs          |       |
| so much . . .                                                                                | atûm . . .            |      | dund             |       |
| soap . . .                                                                                   | sabûn . . .           | P.   | sâfûn            | P.    |
| a social re-union . . .                                                                      | mâilis . . .          | A.   | mâilis           | A.    |
| a sod, a turf . . .                                                                          | chim . . .            | T. ? | chim             | ? T.  |
| soft . . .                                                                                   | shilât . . .          |      | shilêt           |       |
| soft, <i>also</i> fine powder . . .                                                          | palm . . .            |      | pâdhm            |       |
| a land-slip of soil, rock,<br>&c., brought into the<br>stream by a flood of<br>rain, &c. . . | shot . . .            |      | kara kokum       |       |
| a soldering, a joint made<br>by soldering . . .                                              | kafshir . . .         |      | kafkhéir         | P.    |
| the sole of the foot . . .                                                                   | pâsht . . .           |      | naburg           |       |
| some . . .                                                                                   | sum . . .             |      |                  |       |
| something . . .                                                                              | i tsîz . . .          | P.   | i tseiz          | P.    |
| a son . . .                                                                                  | pötr . . .            |      | pöts             |       |
| a son-in-law . . .                                                                           | dâmâd . . .           |      | dumâd            | P.    |
| soot . . .                                                                                   | kat-dhit . . .        |      | chedér           |       |
| a soothsayer . . .                                                                           | mutr katâk-küzg . . . |      | fâl-chi          | A. T. |
| to sort (to select) . . .                                                                    | yawer-n . . .         |      | sarid-ao         |       |
| sordid, mean . . .                                                                           | badh-tap . . .        | ? P. | ghâjd            |       |
| sorrow . . .                                                                                 | gham . . .            | P.   | gham             | P.    |
| a sound . . .                                                                                |                       |      | sherfâ           | P.    |
| to sound (tr.) (to cause<br>any instrument to<br>sound) . . .                                | nawâz-an . . .        | P.   | khhid-ao         |       |
|                                                                                              | nawâz-am . . .        |      | khhei-am         |       |
|                                                                                              | nawâzd-am . . .       |      | khhé-d-am        |       |
|                                                                                              | nawâzetk . . .        |      | khhédhj          |       |
| sour . . .                                                                                   | treshp . . .          | P.   | tükhb            |       |
| to sow (seed) . . .                                                                          | zödh-n . . .          |      | yeth tao         |       |
|                                                                                              | zödh-am . . .         |      | yèdh-am          |       |
|                                                                                              | zödht-am . . .        |      | yeth t-am        |       |
|                                                                                              | zödhetk . . .         |      | yeth tj          |       |
| to sow (cultivate) . . .                                                                     | kür-n . . .           |      | chòrd-ao         |       |
|                                                                                              | kür-am . . .          |      | chòr-am          |       |
|                                                                                              | kösht-am . . .        |      | chòrd-am         |       |
|                                                                                              | köshk . . .           |      | chòrdj           |       |
|                                                                                              |                       |      | <i>also</i>      |       |
|                                                                                              |                       |      | takhirm cheigao  |       |



|                                   | <i>Wakhí.</i>         |       | <i>Sarikolí.</i> |       |
|-----------------------------------|-----------------------|-------|------------------|-------|
| a span . . .                      | avart . . .           |       | wardhord         |       |
| a spark . . .                     | gàrd . . .            |       | khkhârm          |       |
| to give out sparks . . .          | rakhnig nawüz-n . . . |       | yuts nakhtigao   |       |
| a sparrow . . .                   | wingàs . . .          |       | wadhích          |       |
| to speak . . .                    | khan-àk . . .         |       | levd-ao          |       |
|                                   | khàn-am . . .         |       | lev-am           |       |
|                                   | khàtt-am . . .        |       | levd-am          |       |
|                                   | khanétk . . .         |       | levdj            |       |
| a speaker . . .                   | khanàk-küzg . . .     |       | levd-ichoz       |       |
| a speech, a word, talk . . .      | gap, ksà . . .        | P.    | gap              | P.    |
| ready of speech . . .             | ushyâr . . .          | P.    | chechân          | T.    |
| to spin . . .                     | zûp-n . . .           |       | zevd-ao          |       |
|                                   | zûp-am . . .          |       | zeib-am, zevd    |       |
|                                   | zövd-am . . .         |       | zevd-am          |       |
|                                   | zöfk or züpetk . . .  |       | zevdj            |       |
| the spinal chord . . .            | màk . . .             |       | mòk              |       |
| a spindle . . .                   | tsütr . . .           |       | stârkh           |       |
| a spinning wheel . . .            | chârk . . .           |       | chârk            | P.    |
| to spit . . .                     | tuf tseràk . . .      | T.    | tû cheigao       | T.    |
|                                   | tuf tsàram . . .      |       | &c.              |       |
|                                   | tuf (am) kart . . .   |       |                  |       |
|                                   | tuf (am) khötk . . .  |       |                  |       |
| to splash, to slop . . .          | shilâp-an . . .       |       | washlipt-ao      |       |
|                                   | shilâb-am . . .       |       | washlâb-am       |       |
|                                   | shilâpt-am . . .      |       | washlipt-am      |       |
|                                   | shilapötk . . .       |       | washliptj        |       |
| to be splashed up . . .           | stràs-n . . .         |       | zâtrist-ao       |       |
|                                   | stràs-am . . .        |       | zâtrâs-am        |       |
|                                   | strâst-am . . .       |       | zâtrust-am       |       |
|                                   | strâsetk . . .        |       | zâtrustj         |       |
| sound of splashing of water . . . | yupk awâgh . . .      | W. P. | khats sherfâ     | S. P. |
| a split, a fissure . . .          | pâgh . . .            |       | pâgh             |       |
| to split (intr.) . . .            |                       |       | chift-ao         |       |
|                                   |                       |       | chof-am          |       |
|                                   |                       |       | chift-am         |       |
|                                   |                       |       | chiftj           |       |
| to split (tr.), to pierce . . .   |                       |       | chafând-ao, &c.  |       |
| a spoon . . .                     | kapch . . .           | ? P.  | chib             |       |
|                                   | kifehilaz . . .       | P.    | kamich           |       |



|                                                    | <i>Wakhi.</i>                                                                     |       | <i>Sarikoli.</i>                                                  |       |
|----------------------------------------------------|-----------------------------------------------------------------------------------|-------|-------------------------------------------------------------------|-------|
| sport, hunting . . .                               | shkâr . . .                                                                       | P.    | ghéw                                                              | ? T.  |
| to spread <i>see</i> to throw<br>in, &c. . . . .   | kàtâk . . .<br>kâtam . . .<br>kârtam . . .<br>katetk . . .                        |       | wedhd-ao<br>wedh-am<br>wedhd-am<br>wedhdj                         |       |
| to spread, to extend, to<br>flood. (tr.) . . .     | werkhühv-n . . .<br>werkhühv-am . . .<br>werkhhovd-am . . .<br>werkhühvetk . . .  |       | waleisând-ao<br>&c.                                               |       |
| to be spread out, to flood<br>(of the water) . . . | werkhhar-an . . .<br>werkhhar-am . . .<br>werkhhart-am . . .<br>werkhharetk . . . |       | walid-ao<br>walis-am<br>walüid-am<br>walüidj                      |       |
| a spring (of water) . . .                          | zkük . . .                                                                        |       | kaug                                                              |       |
| spring (season) . . .                              | bahâr . . .                                                                       | P.    | wug                                                               |       |
| to spring up . . .                                 | . . .                                                                             |       | zibéd-ao<br>zibân-am<br>zibêd-am<br>zibedhj                       |       |
| a springe . . .                                    | dhüng . . .                                                                       |       | dhomj                                                             |       |
| to sprinkle, to strew . . .                        | zedh-n . . .<br>zedh-am . . .<br>zedhd-am . . .<br>zedhetk . . .                  |       | gieth-ao<br>gieth-am<br>gieth-am<br>giethj                        |       |
| a spy . . .                                        | jâsüs . . .                                                                       | P.    | jâsüs                                                             | P.    |
| to squat . . .                                     | tsok nüdh-n . . .                                                                 |       | tsek nâlistao                                                     |       |
| to squeeze out, to express                         | wazem-n . . .<br>wazem-am . . .<br>wazemd-am . . .<br>wazemetk . . .              |       | sherzd-ao<br>sherz-am<br>shirzd-am<br>shirzdj                     |       |
| to stab, to prick . . .                            | khhalâ ding . . .                                                                 | P. W. | khhalâ dhâdao                                                     | P. S. |
| to stain, to affect, to<br>profit . . . . .        | nadhevs-an . . .<br>nadhevs-am . . .<br>nadhevd-am . . .<br>nadhâfk . . .         |       | nâdhevd-ao<br>{ nadhivs-am<br>nadhavs-t<br>nadhevd-am<br>nadhevdj |       |
| a stake, a post . . .                              | khaddâ . . .                                                                      | T.    | khaddâ                                                            | T.    |



|                                                        | <i>Wakhi.</i>                                   |       | <i>Sarikoli.</i>                        |       |
|--------------------------------------------------------|-------------------------------------------------|-------|-----------------------------------------|-------|
| a stallion . . .                                       | ügür . . .                                      | T.    | eighir . . .                            | T.    |
| to stand, to stay . . .                                | warefs-n . . .                                  |       | warevd-ao . . .                         |       |
|                                                        | warefs-am . . .                                 |       | warâfs-am . . .                         |       |
|                                                        | warefst-am . . .                                |       | wuruvd-am . . .                         |       |
|                                                        | warefsetk . . .                                 |       | warüvdj . . .                           |       |
| a star . . .                                           | stâr . . .                                      |       | khturj . . .                            |       |
| the evening star . . .                                 | sakr stâr ( <i>red star</i> ) . . .             |       | rusht khturj ( <i>red star</i> ) . . .  |       |
| the morning star . . .                                 | karwân kûsh ( <i>the caravan killer</i> ) . . . | P.    | yaulân zâk ( <i>dawn star</i> ) . . .   |       |
| a starling . . .                                       | schu wingâs ( <i>black bird</i> ) . . .         |       | târ wadhîch ( <i>black bird</i> ) . . . |       |
| to start, to depart . . .                              | rawan wâtsn . . .                               | P. W. | râwan setao . . .                       | P. S. |
| to stay, to remain . . .                               | hâl-âk . . .                                    |       | hâst-ao . . .                           |       |
|                                                        | hâl-am . . .                                    |       | hâl-am . . .                            |       |
|                                                        | hâld-am . . .                                   |       | hâst-am . . .                           |       |
|                                                        | haletk . . .                                    |       | hâstj . . .                             |       |
|                                                        |                                                 |       | also réid-ao, &c. . .                   |       |
| to steal . . .                                         | ghûdhi khâk, <i>also</i> . . .                  |       | tsâft-ao . . .                          |       |
|                                                        | dhevu-in . . .                                  |       | { tsîf-am . . .                         |       |
|                                                        | dhuvi-am . . .                                  |       | { tsâf-t . . .                          |       |
|                                                        | dhovoïd-am . . .                                |       | tsâft-am . . .                          |       |
|                                                        | dhövietk . . .                                  |       | tsâftj . . .                            |       |
| steam . . .                                            | tâf . . .                                       | P.    | tef P., büs Y. . .                      |       |
| steel . . .                                            | ķurch . . .                                     | T.    | ķurch . . .                             | T.    |
| steep . . .                                            | khidh . . .                                     |       | padzé . . .                             |       |
| step (father, mother, &c.) . . .                       | bâghi (? P. <i>hostile</i> ) . . .              |       | boghi (? P. <i>hostile</i> ) . . .      |       |
| to stick together (intr.) . . .                        | nadhefs-n . . .                                 |       | nadhevd-ao . . .                        |       |
|                                                        | nadhefs-am . . .                                |       | nadhefs-am, nadhafst . . .              |       |
|                                                        | nadhefst-am . . .                               |       | nadhevd-am . . .                        |       |
|                                                        | nadhefk . . .                                   |       | nadhevdj . . .                          |       |
| to stick into, to infix (as a flower in the cap) . . . | zéravüv-n . . .                                 |       | ingaughând-ao . . .                     |       |
|                                                        | zéravüv-am . . .                                |       | ingaughân-am . . .                      |       |
|                                                        | zéravovd-am . . .                               |       | ingaughând-am . . .                     |       |
|                                                        | zeravüvetk . . .                                |       | ingaughândj . . .                       |       |
| a walking stick . . .                                  | asâi . . .                                      | A.    | asâi . . .                              | A.    |
| to sting or bite . . .                                 | nêsh ding . . .                                 | P. W. | nekh dhâdao . . .                       | P. S. |
| to stir (a fire) . . .                                 | chuk-an . . .                                   |       | châkt-ao . . .                          |       |
|                                                        | chuk-am . . .                                   |       | châk-am . . .                           |       |
|                                                        | chukt-am . . .                                  |       | châkt-am . . .                          |       |
|                                                        | chuketk . . .                                   |       | châktj . . .                            |       |





|                                      | <i>Wakhé.</i>          |    | <i>Sarikoli.</i>                |    |
|--------------------------------------|------------------------|----|---------------------------------|----|
| a stirrup .                          | rekâb .                | A. | padh-bûn ( <i>foot bottom</i> ) |    |
| to stitch roughly .                  | kok ding .             |    | kek dhâdao                      |    |
| a coarse stitch .                    | kok .                  |    | kek                             |    |
| stomach, belly .                     | wânj, dur .            |    | kech                            |    |
| a stone, a rock .                    | ghâr .                 |    | zèr                             |    |
| a fruit-stone .                      | kütük .                |    | rukchi                          | Y. |
| to stop (intr.) .                    | warefs-n .             |    | warevd-ao                       |    |
|                                      | warefs-am .            |    | warâfs-am                       |    |
|                                      | warefst-am .           |    | waruvd-am                       |    |
|                                      | warefsetk .            |    | warüvdj                         |    |
| to stop (tr.) .                      | warafsüvn .            |    | warambândao                     |    |
|                                      | warafsüv-an .          |    | warambân-am                     |    |
|                                      | warafsovd-am .         |    | warambând-am                    |    |
|                                      | warafsüvetk .          |    | warambândj                      |    |
| a rain storm .                       | wur damà .             |    | baréshâ                         | P. |
|                                      | ( <i>rain wind</i> ) . |    |                                 |    |
| a snow storm .                       | zam damà .             |    | chapghîn                        | T. |
|                                      | ( <i>snow wind</i> ) . |    |                                 |    |
| stout, fat, thick .                  | bàj .                  |    | divèz                           |    |
| stoutness, thickness .               | bàji .                 |    | divèzi                          |    |
| straight, right .                    | râst P., shigârd .     |    | khèij, tors                     |    |
| to set straight .                    | râst khâk .            |    | khèij cheigao                   |    |
| straightness .                       | râsti .                |    | khèiji                          |    |
| to strain, to filter .               | schachüv-am .          |    | kardâzd-ao                      |    |
|                                      | schachüv-am .          |    | kardâz-am                       |    |
|                                      | schachovd-am .         |    | kardâzd-am                      |    |
|                                      | schachüvetk .          |    | kardâzdj                        |    |
| a strainer, a cullender .            | schachüvn-küzg .       |    | choghz                          |    |
| strange, unknown .                   | bigânah .              | P. | béigânah                        | P. |
| strength, power .                    | küch .                 |    | kuch                            | T. |
| to stretch out, to extend<br>(tr.) . | rür-n .                |    | rord-ao                         |    |
|                                      | rür-am .               |    | ror-am                          |    |
|                                      | rord-am .              |    | rord-am                         |    |
|                                      | rüretk .               |    | rordj                           |    |
| to strike .                          | ding or diin .         |    | dhâd-ao                         |    |
|                                      | { di-am, di'm .        |    | { dhâ-m                         |    |
|                                      | { dikht .              |    | { dhî-d                         |    |
|                                      | dikht-am .             |    | dhâd-am                         |    |
|                                      | dietk .                |    | dhâdhj                          |    |



|                                               | <i>Wakhí.</i> |   | <i>Sarikolí.</i> |    |
|-----------------------------------------------|---------------|---|------------------|----|
| to cause to strike                            | diüv-n .      | . | dheyând-ao       |    |
|                                               | diüv-am       | . | dheyân-am        |    |
|                                               | diov-d-am     | . | dheyând-am       |    |
|                                               | diüvetk       | . | dheyândj         |    |
| to strike, to touch                           | parvéi-n      | . | bizéid-ao        |    |
|                                               | parvéy-am     | . | bizis-am, bizàst |    |
|                                               | parvet-am     | . | bizeid-am        |    |
|                                               | parvetk       | . | bizedhj          |    |
| to cut into strips                            | khashâk       | . | tizd-ao          |    |
|                                               | khâsh-am      | . | tâz-am           |    |
|                                               | khâsht-am     | . | tizd-am          |    |
|                                               | khashetk      | . | tizdj            |    |
| to stroke, to rub                             | dhast ding    | . | dhüst dhâd-ao    |    |
| strong, powerful                              | küchîn        | . | T. küchîn        | T. |
| strong, lasting                               | pürdâsht      | . | P. pōinug        | P. |
| stubble field                                 | naghaz        | . | nâghâz           |    |
| to stumble                                    | shtrâkh-n     | . | turft-ao         |    |
|                                               | shtrâkh-am    | . | turf-am          |    |
|                                               | shtrâkht-am   | . | turft-am         |    |
|                                               | shtrâkhetk    | . | turftj           |    |
| a stumbler                                    | shtrakhn-küzg | . | turft-ichoz      |    |
| stuttering                                    | gúng          | . | P. kakâch        | T. |
| such                                          | azi           | . | dâs              |    |
| to suck (the breast)                          | shâp-n        | . | rivd-ào          |    |
|                                               | shâp-am       | . | rôv-am           |    |
|                                               | shâpt-am      | . | rivd-am          |    |
|                                               | shâfk         | . | rivdj            |    |
| sugar                                         | nabât         | . | P. nubut         | P. |
| summer                                        | tâbistan      | . | P. menj          |    |
| to summon, to call                            | kiw tserâk    | . | kiw cheigao      |    |
| the Sun                                       | yîr           | . | khher            |    |
| sunrise, East                                 | yîr tserakhh  | . | khher tserakhh   |    |
| sunset, West                                  | yîr wishan    | . | khher nalist     |    |
| supplies, provisions                          | zâu           | . | zâu              |    |
| to support (to raise)                         | wuch tserâk   | . | têr cheigao      |    |
| to surge (of water)                           | shilâp-an     | . | wâshlipt-ao      |    |
|                                               | shilâb-am     | . | wâshlâb-am       |    |
|                                               | shilâpt-am    | . | wâshlipt-am      |    |
|                                               | shilapōtk     | . | wâshliptj        |    |
| to suspend to a peg or<br>hook, to hook (tr.) | zirevüv-n     | . | ingâughând-ao    |    |



|                                        | <i>Wakhi.</i>     |    | <i>Sarikoli.</i> |    |
|----------------------------------------|-------------------|----|------------------|----|
| (see "to hang from a<br>peg", intr.) . | zirevüv-am .      | .  |                  |    |
|                                        | zirevòvd-am .     | .  |                  |    |
|                                        | zirevüvetk .      | .  | &c.              |    |
| suspended .                            | ravindak .        | .  |                  |    |
| to swallow .                           | nezghern .        | .  | imbokht-ao       |    |
|                                        | nezghar-am .      | .  | imboz-am         |    |
|                                        | nezghard-am .     | .  | imbokht-am       |    |
|                                        | nezgharetk .      | .  | imbokhtj         |    |
| a swallow .                            | kildirgâch .      | T. | kalargâch        | T. |
| sweet .                                | khühüzg .         | .  | khhegh           |    |
| to sweep .                             | vishiûw-n .       | .  | zadig-ao         |    |
|                                        | vishiûw-am .      | .  | zador-am         |    |
|                                        | vishiowd-am .     | .  | zadüg-am         |    |
|                                        | vishiûwetk .      | .  | zadügj           |    |
| sweepings .                            | rapk .            | .  | büjein           |    |
| to swell, to ferment .                 | pödhmösh-an .     | .  | baleid-ao        |    |
|                                        | pödhmösh-am .     | .  | baliss-am        |    |
|                                        | pödhmösht-am .    | .  | baléid-am        |    |
|                                        | pödhmöshetk .     | .  | baledhj          |    |
| to swim .                              | keloch khash-âk . | .  | keluch tizd-ao   | T. |
|                                        | —— khash-am .     | .  | &c.              |    |
|                                        | —— khash-am .     | .  |                  |    |
|                                        | —— khashetk .     | .  |                  |    |
| a swimmer .                            | shünâwar .        | P. | khünüwâr         | P. |
| a sword .                              | khingâr .         | P. | midhj            |    |
| a straight sword .                     | shóp kôz .        | P. | khub             | P. |

## T.

|                    |           |    |          |    |
|--------------------|-----------|----|----------|----|
| a tail (horse's) . | bechkam . | .  | dhüm     | P. |
| —— (sheep's) .     | dümbâ .   | P. | dümbâ    | P. |
| to take .          | dürz-n .  | .  | zokht-ao |    |
|                    | dürz-am . | .  | zôz-am   |    |
|                    | dözd-am . | .  | zokht-am |    |
|                    | döžg .    | .  | zokhtj   |    |
| to take away .     | yônd-âk . | .  | yôd-ao   |    |
|                    | yônd-am . | .  | yûs-am   |    |
|                    | yütt-am . | .  | yûd-am   |    |
|                    | yûtk .    | .  | yûdhj    |    |





|                                                                                  | <i>Wakht.</i>                                                                                                  | <i>Sarikoli.</i>                                                                                                 |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| to take care of, to look after . . .                                             | didign . . .<br>didig-am . . .<br>didigd-am . . .<br>didigetk . . .<br><i>also</i> . . .<br>nigàh tserák . . . | chikht-ao . . .<br>chos-am . . .<br>chükht-am . . .<br>chükhtj . . .<br><i>also</i> . . .<br>nigah cheigao . . . |
| a tale, a story, a saying, a proverb . . .                                       | zindàg . . .                                                                                                   | saug . . .                                                                                                       |
| to talk . . .                                                                    | ksà khanàk . . .<br>gap khàk . . .                                                                             | gap cheigao . . .<br><i>or</i> levd-ao . . .                                                                     |
| a talon, a claw . . .                                                            | chang . . .                                                                                                    | P. changâl . . .                                                                                                 |
| tame, tractable, docile . . .                                                    | shov . . .                                                                                                     | shuv . . .                                                                                                       |
| tame, not escaping (staying) . . .                                               | waréfs-n küzg . . .                                                                                            | warevd-ichoz . . .                                                                                               |
| to tan (skins, only sheep and goats') . . .                                      | koz katàk . . .                                                                                                | kuz wedhd-ao . . .                                                                                               |
| the Tartar year cycle, named after 12 animals, is used.                          |                                                                                                                |                                                                                                                  |
| a tassel . . .                                                                   | pulk . . .                                                                                                     | pülk . . .                                                                                                       |
| to taste . . .                                                                   | mazà khàk . . .                                                                                                | maza cheigàn . . .                                                                                               |
| tea . . .                                                                        | châi . . .                                                                                                     | châi . . .                                                                                                       |
| a tea-pot . . .                                                                  | châ-josh . . .                                                                                                 | P. chau-gün . . .                                                                                                |
| to teach . . .                                                                   | yekhk khàk . . .                                                                                               | ikhhmând cheigao . . .                                                                                           |
| to tear, <i>also</i> to tear along (of a living creature moving very fast) . . . | chòk ding . . .                                                                                                | P. W. chuk dhâdaò . . .                                                                                          |
| a tear . . .                                                                     | yashk . . .                                                                                                    | ? T. yukhk . . .                                                                                                 |
| the temple (of the head) . . .                                                   | soyà . . .                                                                                                     | soyâ . . .                                                                                                       |
| ten . . .                                                                        | dhas . . .                                                                                                     | dhes . . .                                                                                                       |
| tender, delicate . . .                                                           | senâf . . .                                                                                                    | nazük . . .                                                                                                      |
| a tendon . . .                                                                   | râg . . .                                                                                                      | P. râg . . .                                                                                                     |
| tepid, lukewarm . . .                                                            | narm . . .                                                                                                     | P. shilet . . .                                                                                                  |
| than, from . . .                                                                 | tsa ( <i>with the Obl. case</i> ) . . .                                                                        | az ——— . . .                                                                                                     |
| that (pron. subst., &c.) . . .                                                   | yao . . .                                                                                                      | yü . . .                                                                                                         |
| that (pron. adj.) . . .                                                          | yâ . . .                                                                                                       | yü . . .                                                                                                         |
| that far, to that extent . . .                                                   | drà-batkan . . .                                                                                               | üm-its . . .                                                                                                     |
| that which is there, the ——— there . . .                                         | hadrà-yüng . . .                                                                                               | üm-enj . . .                                                                                                     |
| that (conj.) . . .                                                               | ki . . .                                                                                                       | kò . . .                                                                                                         |
| that much, so much <i>or</i> many . . .                                          | a-tum . . .                                                                                                    | dund . . .                                                                                                       |



|                                  | <i>Wakhí.</i>         |       | <i>Sariḳolí.</i> |    |
|----------------------------------|-----------------------|-------|------------------|----|
| then . . .                       |                       |       | tom              |    |
| thence . . .                     |                       |       | az-üm            |    |
| there (adv.), thither . . .      | drà, hà-drà . . .     |       | üm               |    |
| there ! (interj.) . . .          | â-ki . . .            |       | u-yu             |    |
| they, those . . .                | yàvisht, yàisht . . . |       | wòdh             |    |
| thick, stout, fat, massive . . . | bàj . . .             |       | divèz            |    |
| thickness, stoutness . . .       | bàji . . .            |       | divèzi           |    |
| a thief . . .                    | ghûdh . . .           |       | ziedh            |    |
| thievery . . .                   | ghûdhi . . .          |       |                  |    |
| the thigh . . .                  | malung yàich . . .    |       | madhân khoj      |    |
|                                  | lang . . .            | P.    | bikhtun          |    |
| a thimble . . .                  | pùlàngösht . . .      | W. P. | ûimâk            | T. |
| thin, lean . . .                 | khât . . .            |       | khharâb          | P. |
| thin, slender (of things) . . .  | sanâr . . .           |       | tanûk            |    |
| to thirst, to become             |                       |       |                  |    |
| thirsty . . .                    | tàkhh wâtsn . . .     | ? P.  | tür set-ao       |    |
| thirsty . . .                    | tàkhh . . .           | ? P.  | tür              |    |
| this . . .                       | yem . . .             |       | yam              |    |
| this much . . .                  | ma-tum . . .          |       | mund             |    |
| this very . . .                  | ha-yem . . .          |       | ha-yam, nak-yam  |    |
| a thorn fence . . .              | chit . . .            | T.    | chit             | T. |
| a thorn . . .                    | zakh . . .            |       | shudh            |    |
| a thorn bush . . .               | chirîr . . .          |       | khâr             | P. |
| thou . . .                       | tu . . .              |       | tao              |    |
| a thousand . . .                 | hazâr . . .           | P.    | hazâr            | P. |
| a thread (of cotton) . . .       | wasé . . .            |       | padets           |    |
| —— (of wool) . . .               | zûtr . . .            |       | vürgh            |    |
| a thread of hemp or              |                       |       |                  |    |
| hair, &c. . .                    | dârch . . .           |       | shâuni           |    |
| three . . .                      | trûi . . .            |       | harôi            |    |
| the throat . . .                 | alkûm . . .           | A.    | alkûm            | A. |
| to throw, to throw away          | büng . . .            |       | paṭàod-ao        |    |
|                                  | bün-am . . .          |       | paṭào-am         |    |
|                                  | bond-am . . .         |       | paṭàod-am        |    |
|                                  | bûnetk . . .          |       | paṭàodj          |    |
| to throw down, to over-          |                       |       |                  |    |
| throw . . .                      | büt-an . . .          |       | imbât-ao         |    |
|                                  | büt-am . . .          |       | imbat-am         |    |
|                                  | bött-am . . .         |       | imbatt-am        |    |
|                                  | bütetk . . .          |       | imbâtj           |    |



|                                                                            | <i>Wakhi.</i>                                                | <i>Sarikoli.</i>                                              |    |
|----------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------|----|
| to throw in, to throw off,<br>to pour in or out, to<br>arrange, to appoint | katàk<br>kàtt-am<br>kàrt-am<br>katetk                        | wedhd-ao<br>wedh-am<br>wedhd-am<br>wedhdj                     |    |
| to throw over, to reverse<br>the thumb                                     | savàn ding<br>ghösch yangl<br>(male finger)                  | skelàk dhâdao<br>nièr ingakht<br>(male finger)                |    |
| thunder                                                                    | tungür                                                       | sadà                                                          |    |
| to thunder                                                                 | tungür ding                                                  | sadà cheig-ao                                                 |    |
| thus                                                                       | hazi, azi                                                    | dâs, nak-dâs                                                  |    |
| thus much                                                                  | ma-tum                                                       | mund                                                          |    |
| Tibet (Ladàk, &c.)                                                         | Tibet                                                        | Tibàt                                                         |    |
| a tick                                                                     | kuwand                                                       | khhesàk                                                       |    |
| a tickling                                                                 | gilgöch                                                      | gilgich                                                       |    |
| to tie in a knot                                                           | jirekh ding                                                  | jirekh dhâdao                                                 |    |
| to tie head and tail to-<br>gether                                         | pa i-'m-an kantar khàk                                       | pa i-mi vistao                                                |    |
| tight, narrow                                                              | tang                                                         | tong                                                          | P. |
| to tighten                                                                 | shukh khàk                                                   | ching cheig-ao                                                | T. |
| till when                                                                  | tsoghd-batkan                                                | chum-its                                                      |    |
| time (precise), epoch                                                      | alâ, mahâl                                                   | alâ, wakht                                                    | A. |
| time (so many times)                                                       | pitig                                                        | pitig                                                         |    |
| tin                                                                        | kaliâ                                                        | kaliah                                                        | A. |
| tinder                                                                     | khhaf                                                        | khhof                                                         | P. |
| a tinkling                                                                 | jiringàs                                                     | jiringàs                                                      |    |
| to tire (tr.)                                                              | warechüv-n<br>warechüv-am<br>warechóvd-am<br>warechüvetk     | warezând-ao<br>&c.                                            |    |
| to be tired                                                                | warech-n<br>{ warech-am<br>{ waresht<br>wanegn-am<br>warekhk | warezd-ao<br>{ wareiz-am<br>{ warez-d<br>warezd-am<br>warezdz |    |
| to (motion or intention<br>towards) [definite]                             | tar —                                                        | pa —, tar —<br>par —,                                         |    |
| to — [indefinite]                                                          | — ar, ar —                                                   | — ar, ar —                                                    |    |
| to-day                                                                     | wudhg                                                        | nür                                                           |    |



|                                         | <i>Wakhi.</i>       |       | <i>Sarikoli.</i>        |       |
|-----------------------------------------|---------------------|-------|-------------------------|-------|
| together . . .                          | kattî . . .         | P.    | kattî . . .             | P.    |
| to-morrow . . .                         | varok . . .         |       | pigâh . . .             | P.    |
| tongue, language . . .                  | zik . . .           |       | ziv . . .               | P.    |
| a tooth . . .                           | dündük . . .        |       | dhândân . . .           | P.    |
| on the top (adv.) . . .                 | sāk tsusk . . .     |       | } — chū tēr . . .       |       |
| on the top of (p. p.) . . .             | sāk — tsusk . . .   |       |                         |       |
| torture, <i>also</i> trouble . . .      | kiin . . .          |       | ķain . . .              | T.    |
| to totter, to waver, to vacillate . . . | gâch-n . . .        |       | wakucht-ao . . .        |       |
|                                         | gâch-am . . .       |       | wakoch-am . . .         |       |
|                                         | gâcht-am . . .      |       | wakucht-am . . .        |       |
|                                         | gachetk . . .       |       | wakuchtj . . .          |       |
| to touch, to attain . . .               | parvâi-n . . .      |       | bizeidao . . .          |       |
|                                         | parvêy-am . . .     |       | bizîs-am, bizâst . . .  |       |
|                                         | parvet-am . . .     |       | bizêid-am . . .         |       |
|                                         | parvetk . . .       |       | bizedhj . . .           |       |
| touching, contiguous . . .              | piwas . . .         | P.    | peiwest . . .           | P.    |
| towards . . .                           | — gana . . .        |       | tar — guna . . .        |       |
| a town . . .                            |                     |       | khâr (shahr) . . .      | P.    |
| a town-crier . . .                      | suran-chi . . .     | T.    | ulam-chi . . .          | A. T. |
| a foot track . . .                      | podh . . .          |       | pedh . . .              |       |
| to train (a hawk, &c.) . . .            | yekhk khâk . . .    |       | ikhhmând cheig-ao . . . |       |
| to tread down . . .                     | nispar-an . . .     |       | nakhpîg-ao . . .        |       |
|                                         | naspar-am . . .     |       | nakhpor-am . . .        |       |
|                                         | naspart-am . . .    |       | nâkhpug-am . . .        |       |
|                                         | naspöretk . . .     |       | nakhpugj . . .          |       |
| <i>also</i> . . .                       | pimâl khâk . . .    | P. W. | peimâl cheigào . . .    |       |
| a tree . . .                            | darakht . . .       | P.    | darakht . . .           | P.    |
| to tremble . . .                        | tâp-n . . .         |       | jumbd-ao . . .          | P.    |
|                                         | tâp-am . . .        |       | jumb-am . . .           |       |
|                                         | tâpt-am . . .       |       | jumbd-am . . .          |       |
|                                         | tapetk . . .        |       | jumbdj . . .            |       |
| to tremble, to shiver . . .             | larzâ khâk . . .    | P.    | larzâ cheigao . . .     | P.    |
| trial, <i>also</i> tried . . .          | azmâish . . .       | P.    | âzmüd . . .             | P.    |
| to trip up (intr.) . . .                | shtrakhhân . . .    |       | turft-ao . . .          |       |
|                                         | shtrakhh-am . . .   |       | turf-am . . .           |       |
|                                         | shtrakhhht-am . . . |       | turft-am . . .          |       |
|                                         | shtrakhhetk . . .   |       | turftj . . .            |       |
| to trip up (tr.) . . .                  | shtrakhhöv-n . . .  |       | turfând-ao . . .        |       |
|                                         | shtrakhhöv-am . . . |       | turfân-am . . .         |       |



|                                 | <i>Wakhi.</i>  |   | <i>Sarikoli.</i>       |       |
|---------------------------------|----------------|---|------------------------|-------|
|                                 | shtrakhhövd-am | . | turfând-am             |       |
|                                 | shtrakhhövetk  | . | turfândj-am            |       |
| a trot (pace of a horse)        | dzokn          | . | dzekt                  |       |
| to trot                         | dzokn          | . | dzekt-ao               |       |
|                                 | dzok-am        | . | dzek-am                |       |
|                                 | dzokt-am       | . | dzekt-am               |       |
|                                 | dzoketk        | . | dzektj                 |       |
| trouble                         | rönj           | . | P. amgàk               | T.    |
| troublesome, difficult          | kilà           | . | kilà                   |       |
| a wooden trough                 | pütkhârm       | . | khhâkh                 |       |
| the trough of a water mill      | niüw           | . | nao                    | P.    |
| trousers, drawers               | tümbân         | . | P. tambân              | T.    |
| wide outer trousers             | shawâlak.      | . | shim                   | T.    |
| true                            | râst           | . | rust                   | P.    |
| to trust                        | ishânz tseràk  | . | piti set-ao            | T. S. |
| to speak truth                  | râst khanàk    | . | rust levd-ao           | P.    |
| to try, to prove                | âzmud tseràk   | . | P. W. âzmüd cheigao    | P. S. |
| to tuck up (sleeves &c.)        | gürt-an        | . | padawid-as             |       |
|                                 | gürt-am        | . | padawéz-am             |       |
|                                 | gortt-am       | . | padawükht-am           |       |
|                                 | gürtetk        | . | padawükhtj             |       |
| a tumult, a noise               | surân          | . | kichkirân              | ? T.  |
| a turban                        | sallà          | . | dastûr                 | P.    |
| a turf, a sod                   | chim           | . | T. ? chim              | T. ?  |
| the Tûrkis of Eastern Turkistan |                |   | Mughul                 |       |
| a turn, succession              | nobât          | . | A. nubât               |       |
| to turn (in a lathe)            | zirû-in        | . | kirist-ao              |       |
|                                 | zirând-am      | . | kirân-am               |       |
|                                 | zirest-am      | . | kirând-am              |       |
|                                 | ziresetk       | . | kirândj                |       |
| to turn back (tr.)              | pshû-n         | . | wâzepând-ao            |       |
|                                 | pshû-am        | . | wâzepân-am             |       |
|                                 | pshaud-am      | . | wâzepând-am            |       |
|                                 | pshuetk        | . | wâzepândj              |       |
| to turn back (intr.)            | pshên          | . | wâzabt-ao or wâzevd-ao |       |
|                                 | pshêw-am       | . | wâzeib-am wâzevs-am    |       |
|                                 | pshett-am      | . | wâzabt-am wâzevd-am    |       |
|                                 | pshetk         | . | wâzabtj wâzevdj        |       |
| to turn round                   | gîr-n          | . | gherd-ào               |       |





|                            | <i>Wakhi.</i>             |       | <i>Sarikoli.</i>           |    |
|----------------------------|---------------------------|-------|----------------------------|----|
| a turner, a man who        |                           |       |                            |    |
| uses a lathe . . .         | zirüin-küzg . . .         |       | ķirist-iehoz               |    |
| twenty . . .               | wist . . .                |       | wist                       | P. |
| a twig . . .               | yakh . . .                |       | pütāk                      | T. |
| to twist (tr.) . . .       | tovn <i>or</i> tov tserāk |       | tuv cheigao                | P. |
|                            | tov-am                    |       | &c.                        |    |
|                            | tov (am) kàrt             |       |                            |    |
|                            | tov (am) khötk            |       |                            |    |
| to twist, to wind, (as a   |                           |       |                            |    |
| turban) . . .              | zwài-n . . .              |       | zarwid-ao                  |    |
| to twitter, to chirp . . . | chir-an . . .             | ? T.  | chird-ao                   |    |
|                            | chir-am . . .             |       | chir-am                    |    |
|                            | chird-am . . .            |       | chird-am                   |    |
|                            | chiretk . . .             |       | chirdj                     |    |
| two . . .                  | bûi . . .                 |       | dhâu                       |    |
| twofold, &c., . . .        | bû-pitig, &c. . .         |       | dhâ-pitig, &c.             |    |
| <b>U.</b>                  |                           |       |                            |    |
| ugly . . .                 | shak, battilhât           | P. A. | dhèw khèr                  |    |
| uncle . . .                | bach . . .                |       | dudh                       |    |
| under . . .                | bôn . . .                 |       |                            |    |
| to understand . . .        | kshüin ( <i>to hear</i> ) |       | khîd-ao ( <i>to hear</i> ) |    |
| understanding . . .        | kshüin . . .              |       | khîd                       |    |
| to unite, to join . . .    | katti khàk . . .          |       | ķatti cheig-ao             |    |
| unripe, uncooked . . .     | yüng . . .                |       | khum                       | P. |
| to untie, to undo . . .    | wushüin . . .             |       | hât cheigao                |    |
|                            | wushûy-am . . .           |       | &c.                        |    |
|                            | washan-am . . .           |       |                            |    |
|                            | wushang . . .             |       |                            |    |
| an untruth, a lie . . .    | durogh . . .              | P.    | fand                       | P. |
| up . . .                   | pa khidh . . .            |       | padzé                      |    |
| upper . . .                | wuch-ung . . .            |       | tèr-nènj                   |    |
| upon, on the top of . . .  | sak—tsusk . . .           |       | — chü tèr, chü — tèr       |    |
| upright . . .              | tsok . . .                |       | tsèk                       |    |
| upright, standing (of liv- |                           |       |                            |    |
| ing beings) . . .          | warefsetk . . .           |       | warüvdj                    |    |
| to set upright . . .       | tsok ding . . .           |       | tsèk dhádao                |    |
| upwards . . .              | pa-khidh màrs . . .       |       | padzé-dàs                  |    |
| <b>V.</b>                  |                           |       |                            |    |
| various . . .              | rang rang . . .           | P.    | khil khil                  | P. |
| this very, this same . . . | ha-yem . . .              |       | nik-yam                    |    |



|                         | <i>Wakhi.</i>     | <i>Sarikoli.</i>   |    |
|-------------------------|-------------------|--------------------|----|
| a water vessel .        | lût .             | liet .             |    |
| vicious .               | wakn-küzg .       | wâkt-ichoz .       |    |
|                         | tasîn-diin-küzg . | tasîn dhâd-ichoz . |    |
| a village .             | diâr .            | diûr .             | P. |
| a kind of violin .      | kumuz .           | kumuz .            |    |
| a virgin, a maid .      | pûr-chodh .       | P. ghâts .         |    |
| to visit, also to see . | wing .            | wând-ao .          |    |
|                         | win-am .          | wéin-am .          |    |
|                         | wind-am .         | wând-am .          |    |
|                         | winetk .          | wândj .            |    |
| a vulture .             | tsâr .            | tsârgħ .           | P. |

### W.

|                                   |                |                        |       |
|-----------------------------------|----------------|------------------------|-------|
| to wade, to ford .                | türt ding .    | paug dhâdao .          |       |
| wages, pay .                      | mazd .         | P. muzd .              | P.    |
| a waist-sash .                    | mîûn .         | miund .                | P.    |
| a man's waist .                   | madh .         | mêdh .                 |       |
| to walk, to go .                  | tuk-an .       | tid-ao .               |       |
| to walk about .                   | shkûr-an .     | khkéig-ao .            |       |
|                                   | shkur-am .     | khkâr-am, khker-d .    |       |
|                                   | shkurd-am .    | khkaug-am .            |       |
|                                   | shkurgetk .    | khkaugj .              |       |
| a wall .                          | diwâl .        | P. dèiwul .            | P.    |
| walnut .                          | tor .          | ghâuz .                |       |
| —— wards .                        | — mârš .       | —— dâs .               |       |
| a wart .                          | damösch .      | zösh .                 |       |
| to wash .                         | wuzd-uk .      | zanâd-ao .             |       |
|                                   | wüzdi-am } .   | zanèy-am .             |       |
|                                   | wüzdüi-d } .   |                        |       |
|                                   | wozdoid-am .   | zanûd-am .             |       |
|                                   | wuzdietk .     | zanûdbj .              |       |
| a wasp .                          | dhôs .         | hari .                 | T.    |
| to watch, to look after .         | nigâh tserâk . | P. W. nigâh cheig-ao . | P. S. |
| to watch intently .               | didig-n .      | chikht-ao .            |       |
|                                   | didig-am .     | châs-am .              |       |
|                                   | didigd-am .    | chükht-am .            |       |
|                                   | didigetk .     | chükhtj .              |       |
| water .                           | yupk .         | khâts .                |       |
| water-course, a canal .           | charm, wâdh .  | wâdh .                 |       |
| a watering place (of<br>cattle) . | yupk jâi .     | W. P. khökh-tuj .      |       |



|                                          | <i>Wakhi.</i>      |       | <i>Sarikoli.</i>     |       |
|------------------------------------------|--------------------|-------|----------------------|-------|
| a wave . . .                             | shilapt . . .      |       | washlipt . . .       |       |
| wax . . .                                | mum . . .          | P.    | mum . . .            | P.    |
| to lose the way . . .                    | rapatsan . . .     |       | nalkhhid-ao . . .    |       |
|                                          | rapits-am } . . .  |       | nalkhhan-am . . .    |       |
|                                          | repats-t } . . .   |       | nalkhhüd-am . . .    |       |
|                                          | rapagn-am . . .    |       | nalkhhüdj . . .      |       |
|                                          | rapakhk . . .      |       | mash . . .           |       |
| we . . .                                 | sak . . .          |       | yeragh . . .         | T.    |
| weapons, arms . . .                      | asbâb . . .        | P.    | kênâ sétâo . . .     |       |
| to wear out (intr.) . . .                | kohna wâtsn . . .  |       | khürdhâh setâo . . . | P. S. |
| to wear down (intr.) . . .               | sûdhah wâtsn . . . | P. W. | dağât . . .          | P.    |
| weariness . . .                          | dağat . . .        |       |                      |       |
| to weed, to pull out<br>weeds, &c. . . . | rut tserâk . . .   |       | rüt cheig-ao . . .   |       |
|                                          | nazdün khâk . . .  |       | khaui cheigao . . .  |       |
| to weep . . .                            | niûw-n . . .       |       | niûwd-ao . . .       |       |
|                                          | niûw-am . . .      |       | nâw-am . . .         |       |
|                                          | nâud-am . . .      |       | niûwd-am . . .       |       |
|                                          | niûwetk . . .      |       | niûwdj . . .         |       |

Weights and Measures. No weights or balances known. Flour, &c. is sold by dry measure, containing what is called a 'chârak' T. in Sarikol (about 10 lbs.). In Wakhân a 'por' is used, being a wooden vessel (hollowed out of a single log of wood, with a bottom fixed to it) containing some 80 lbs. of flour.

|                                         |                    |       |                      |       |
|-----------------------------------------|--------------------|-------|----------------------|-------|
| well, in good health . . .              | tan-dürüst . . .   | P.    | sok . . .            | T.    |
| well, happy . . .                       | sihât . . .        | A.    | tinj . . .           | T.    |
| a well . . .                            | chal . . .         |       | ķüdûgh . . .         | T.    |
| well-paced, fast . . .                  | wéyawîn . . .      |       | wéyawîn . . .        |       |
| West, sunset . . .                      | yir wishan . . .   |       | khher tserakhh . . . |       |
| wet, damp . . .                         | khhaich . . .      |       | khhât . . .          |       |
| wetness, dampness . . .                 | khhaichi . . .     |       | khhâsti . . .        |       |
| what ? . . .                            | tsiz . . .         | P.    | tsèiz . . .          | P.    |
| what like ? also how ? . . .            | tsa-rang . . .     | W. P. | tsa-râng . . .       | S. P. |
| at what time ? . . .                    | tsa wakhht . . .   | W. A. | tsa wakhht . . .     | S. A. |
| what for ? to what pur-<br>pose ? . . . | tsiz-ar . . .      |       | tséiz-ar . . .       |       |
| in what direction ? . . .               | tar kum ginâ . . . |       | tar kâ gunâ . . .    |       |
| on what side ? . . .                    | tar kum sar . . .  |       | tar kâ sar . . .     |       |
| wheat . . .                             | ghidim . . .       |       | zândâm . . .         | P.    |



|                                                                                                                                                                    | <i>Wahkí.</i>                                |       | <i>Sarikolí.</i>    |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------|---------------------|-------|
| when . . .                                                                                                                                                         | tsoghd (? for tsa-wakt)                      |       | chum                |       |
| till when . . .                                                                                                                                                    | tsoghd-batkan . . .                          |       | chum-its            |       |
| whence ? . . .                                                                                                                                                     | tsa-kum-an . . .                             |       | az-kâ               |       |
| whenever . . .                                                                                                                                                     | har wakhht . . .                             | P.    | har wakhht          | P.    |
| where . . .                                                                                                                                                        | kum-jâi . . .                                | W. P. | kâ-júi              | S. P. |
| where ? well ? . . .                                                                                                                                               | kumâi . . .                                  |       | kâyi                |       |
| to whet, to sharpen . . .                                                                                                                                          | pasân ding . . .                             |       | pasân dhâdao        |       |
| which, who ? . . .                                                                                                                                                 | kum . . .                                    |       | chidâm              |       |
| which has been done . . .                                                                                                                                          | khötk-ung . . .                              |       | chaugj-enj          |       |
| whilst . . .                                                                                                                                                       |                                              |       | —— its              |       |
| a whip . . .                                                                                                                                                       | rashîp . . .                                 |       | kamchi              | T.    |
| a whirlwind, a devil . . .                                                                                                                                         | liw damâ . . .                               |       | dhéw balamüt        |       |
| to whisper . . .                                                                                                                                                   | mulâim kşâ khâk . . .                        |       | khish gap cheigao   |       |
| to whistle . . .                                                                                                                                                   | shkhhélân khâk . . .                         |       | shkhhélûn cheigao   |       |
| a whistle, whistling . . .                                                                                                                                         | shkhhélân . . .                              |       | shkhhélûn           |       |
| white . . .                                                                                                                                                        | rukhn . . .                                  |       | spéid               |       |
| a white frost, also dew . . .                                                                                                                                      | shak . . .                                   |       | khok                |       |
| who ? . . .                                                                                                                                                        | kûi . . .                                    |       | choi                |       |
| whoever . . .                                                                                                                                                      | har kûi, har kum . . .                       | P. W. | har choi            | P. S. |
| the whole, all . . .                                                                                                                                               | kûkht . . .                                  |       | fûk                 |       |
| why ? on account of . . .                                                                                                                                          |                                              |       |                     |       |
| what ? . . .                                                                                                                                                       | tsîz jinib . . .                             | W. P. | tséiz-ivon          |       |
| why ? to what purpose ? . . .                                                                                                                                      | tsîz-ar . . .                                |       | tseiz-ar, tsa'r     |       |
| a widow . . .                                                                                                                                                      | biwâ . . .                                   | P.    | béwâ zan            | P.    |
| width, breadth . . .                                                                                                                                               | bâr . . .                                    |       | bâr                 | P.    |
| a wife . . .                                                                                                                                                       | könd, yupk-wâr ( <i>water-drawer</i> ) . . . |       | ghîn, rozagâr-i-nék |       |
| wild onions . . .                                                                                                                                                  | karilghân . . .                              |       | karilghân           |       |
| wild, untamed . . .                                                                                                                                                | lâlm . . .                                   |       | lelmi               |       |
| a wild dog (hunting in packs, the size of a large sheep-dog, yellow, with small standing black ears, and black nose, a thin straight tail), Turki <i>âju</i> . . . | kik . . .                                    |       | kâuj                |       |
| a wild ass ( <i>Equus Hemionus</i> ), found in Pamir . . .                                                                                                         | kulân . . .                                  |       | kulân               | T.    |





|                         | <i>Wakhi.</i> |   | <i>Sarikoli.</i>   |          |
|-------------------------|---------------|---|--------------------|----------|
| a willow (tree) .       | tük           | . | wanûj              |          |
| wind, air .             | damà          | . | khèr, shamâl       | T.       |
| to wind, to twist       | zwaï-n        | . | zarwîd-ao          |          |
|                         | zway-am       | . | zarwéy-am          |          |
|                         | zwett-am      | . | zarwîd-am          |          |
|                         | zwetk         | . | zarwedhj           |          |
| the wind-pipe .         | kalitok       | . | khporg             |          |
| a wing .                | par           | . | P. kanât           | T. or P. |
| winnings (substantive)  |               |   |                    |          |
| at the game of sheep's  |               |   |                    |          |
| knuckle bones           | âlchi         | . | T. âlchi           | T.       |
| to winnow .             | büng          | . | davând-ao          |          |
|                         | bün-am        | . | davân-am           |          |
|                         | bond-am       | . | davând-am          |          |
|                         | bünetk        | . | davândj            |          |
| winter .                | zümistân      | . | P. zümistân        | P.       |
| to wipe .               | vishiûw-an    | . | zadig-ao           |          |
|                         | vishiûw-am    | . | zador-am           |          |
|                         | vishiôwd-am   | . | zadüg-am           |          |
|                         | vishiûwetk    | . | zadügj             |          |
| — wise, — wards         | mârs          | . | dâs                |          |
| with, by, by means of   | { da ——— an   | . | ——— its            |          |
|                         | { ——— möshön  | . | ——— its, ——— kàtti |          |
| with, (together with)   | ——— möshön    | . |                    |          |
| without, deprived of    | bi ———        | . | bé ———             |          |
| a wolf .                | shâpt         | . | khithp             |          |
| a woman, a wife         | könd, stréi   | . | ghin, stir         |          |
| a young woman           | pürchodh      | . | pchéin             |          |
| an old woman .          | kampir        | . | P. kampir          | P.       |
| a woman connected with  |               |   |                    |          |
| another by being wife   |               |   |                    |          |
| of the same husband     | bâghi         | . | béinzâr            |          |
| a woman's head kerchief |               |   |                    |          |
| or mantilla .           | chil          | . | khhadhbân          |          |
| wood, a stick .         | shung         | . | khüng              |          |
| a woodman, a fuel       |               |   |                    |          |
| fetcher .               | gûz-vor       | . | zez-vor            |          |
| wool .                  | gôr           | . | wân                |          |
| a word, a speech        | ksa, gap      | . | P. gap             | P.       |
| work, business .        | yark          | . | chèr               |          |
| a worm, a grub .        | prich         | . | cherin             | P.       |





## Wakht.

## Sarikol.

|                                   |   |              |   |       |                         |    |
|-----------------------------------|---|--------------|---|-------|-------------------------|----|
| to worship, (to bow the head)     | . | sar khâmüv-n | . | P. W. | kâl khambând-ao         |    |
| a wound                           | . | zâkhm        | . | P.    | zâkhm                   | P. |
| to wrap, to wind                  | . | zwaîn        | . | .     | parwid-ao               |    |
| to wrestle (to seize one another) | . | imân wadhûrn | . | .     | miûn pa-khat wadhord-ao |    |
| to wring                          | . | zûmând-an    | . | .     | tipt-ao                 |    |
|                                   | . | zûmând-am    | . | .     | tâb-am, tip-t           |    |
|                                   | . | zûmânddi-am  | . | .     | tipt-am                 |    |
|                                   | . | zûmândetk    | . | .     | tiptj                   |    |
| to cause to wring                 | . | zûmândüv-n   | . | .     | tabând-ao               | T. |
|                                   | . | zûmândüv-am  | . | .     | tabân-am, &c.           |    |
|                                   | . | zûmandovd-am | . | .     |                         |    |
|                                   | . | zûmandüvetk  | . | .     |                         |    |
| the wrist                         | . | parsang      | . | .     | pardhüst                |    |
| to write                          | . | nevish-an    | . | .     | nâvisht-ao              |    |
|                                   | . | nevish-am    | . | .     | nâvisht-am              |    |
|                                   | . | nevisht-am   | . | .     | nâvisht-am              |    |
|                                   | . | nevishetk    | . | .     | nâvishtj                |    |
| to writhe, to twist oneself       | . | to v khâk    | . | .     | tiptao                  |    |
|                                   | . | to v-am      | . | .     | tâb-am                  |    |
|                                   | . | to v-d-am    | . | .     | tipt-am                 |    |
|                                   | . | to vetk      | . | .     | tiptj                   |    |

## Y.

|                                |   |                 |   |    |                             |    |
|--------------------------------|---|-----------------|---|----|-----------------------------|----|
| a yak ( <i>Bos grunniens</i> ) | . | dzugh           | . | .  | staur                       |    |
| the city of Yarkand            | . | Yârkand         | . | .  | khâr ( <i>shahr</i> = town) | P. |
| a man of Yarkand               | . | Yârkandi        | . | .  | khâri                       | P. |
| a year                         | . | sar-i-sâl       | . | P. | sar-i-sâl                   | P. |
| a half year                    | . | sâl             | . | P. | sâl                         | P. |
| last year                      | . | pard            | . | .  | parwus                      |    |
| of last year                   | . | pard-üng        | . | .  | parwus-enj                  |    |
| a yearling bull calf           | . | nâband          | . | P. | khajâk                      |    |
| — cow calf                     | . | raghûm          | . | .  | nauzâd                      | P. |
| to yearn                       | . | indokhtj tserâk | . | .  | gûrm cheig-ao               |    |
| yellow                         | . | zard            | . | P. | zird                        | P. |
| yesterday                      | . | yéz             | . | .  | khiéb                       |    |
| a yoke                         | . | sivar           | . | .  | yûgh                        | P. |
| you                            | . | savisht, saisht | . | .  | tamâsh                      |    |



|                                      | <i>Wakhi.</i> | <i>Sarikoli.</i> |
|--------------------------------------|---------------|------------------|
| a young camel .                      | üshtür zaman  | tailäk           |
| a young woman .                      | pürchodh      | pehéin           |
| pregnant, with young<br>(of animals) | varenj        | varinz           |
| youth .                              | jawâni        | P. jawâni P.     |

### COMPARATIVE VOCABULARY.

**Wakhi', Sarikoli', Shighni, Sangli'chi, Minja'ni.**

(The three latter collected by *Munshi Faiz Bakhsh.*)

*English. Wakhi. Sarikoli. Shighnân. Sanglich. Minjân.*

#### A.

|           |        |      |        |      |        |
|-----------|--------|------|--------|------|--------|
| apple .   | mür    | mân  | mùn    |      | aminga |
| apricot . | chiwân | nôsh |        |      | cheri  |
| arrow .   |        | pudh | pás    |      |        |
| ass .     | khur   | sher | markab | khár | kara   |
| awake .   | agah   | agâh | andez  |      |        |

#### B.

|           |           |         |                  |              |         |
|-----------|-----------|---------|------------------|--------------|---------|
| back .    | dâm       | dom     | dám              | kamik        |         |
| bad .     | shâk      | zît     | ganda            |              |         |
| barley .  | yürk      | chüshj  | joshach          | vurvuth      | kâsak   |
| bear .    | naghordum | yürkh   | pursh* (? yursh) |              |         |
| beard .   | reghish   | bun     | bûn              |              | yârzhah |
| beat .    | di        | dhâ     |                  |              | doh     |
| belly .   | dur       | kech    | kich             | diyír        |         |
| big .     | lup       | laur    | sark             |              |         |
| bitter .  | talkh     | tsekh   | saish            |              |         |
| black .   | schû      | târ     |                  | shòi         | tarávi  |
| blood .   | wukhan    | wakhhîn |                  | vain         |         |
| bone .    | yaich     | ustkhân |                  | ásták        | pástí   |
| bosom .   | bap       | tej     | bash             | chiji        |         |
| brain .   | maghz     | mâghz   | mâghz            |              |         |
| bread .   | khôch     | khpih   | gardah           | khesta       | naghan  |
| breast .  | púz       | poz     |                  | yuz (? puz)† |         |
| bring .   | wüzüm     | vor     |                  | nas          | abar    |
| brother . | vrût      | vrôd    | brád             | vurd         |         |

\* Perhaps پوش by mistake for يورش (*yursh*), which in Sarikoli would become *yurkh* by the common change of *sh* into *kh*.

† Viz. پوز a mistake for پوز ?



*English. Wakhi. Sariqolî. Shighnân. Sanglich. Minjân.*

**C.**

|          |          |                      |            |           |             |
|----------|----------|----------------------|------------|-----------|-------------|
| canal    | . charm  | . wâdh               | .          | . chodar  | .           |
| cap      | . tumâgh | . tumâgh             | . tâki     | .         | . khola     |
| cat      | . pish   | . pish               | . pash     | .         | .           |
| chain    | . zanzir | . zanzeir            | . ginzîr   | .         | .           |
| charcoal | .        | .                    | .          | . zich    | .           |
| cheek    | . lunj   | . nurj               | . pes      | . peshur  | .           |
| chin     | .        | .                    | . zîngú    | . alashah | . alakhshah |
| cloak    | . bôt    | . lèl                | .          | . vanjîn  | .           |
| cold     | . sūr    | . îsh                | . shitâgh  | .         | .           |
| come     | . wazi   | . yâdh               | . (tará)it | . es      | . as        |
| couch    | .        | .                    | . manja    | .         | .           |
| cow      | . ghû    | . zâu                | . istaor   | . ghao    | . ghaoda    |
|          |          | staur ( <i>yak</i> ) |            |           |             |
| crow     | . karghî | . karghâ             | . khoro    | .         | .           |
| curd     | . pài    | . pòi                | .          | . neduk   | . niyâ      |

**D.**

|           |           |                     |         |                        |           |
|-----------|-----------|---------------------|---------|------------------------|-----------|
| daughter, | . dhagd   | . ghâts             | . ghâts | . odagh                | . loghda  |
|           |           | ( <i>a maiden</i> ) |         |                        |           |
| day       | . rwâr    | . mâth              | .       | . rusht                | .         |
| (dawn)    | . rûkhn   | .                   | .       | .                      | .         |
| death     | . marg    | . marg              | .       | . murda                | .         |
| dog       | . shâch   | . kûd               | . kod   | . kôd                  | . ghâlb   |
| door      | . bâr     | . divîr             | .       | .                      | . labra   |
| down      | . kilapaï | . nughusûr          | .       | . pòyan                | . forsâra |
| drink     | . pöv     | . brâz              | . brez  | . khvar(? <i>eat</i> ) | . khâr    |
| dust      | . shet    | . sît               | .       | . shat                 | . gharâi  |

**E.**

|          |         |         |          |           |         |
|----------|---------|---------|----------|-----------|---------|
| ear      | . ghish | . ghaul | . ghao   | . ghovar  | .       |
| earth    | . wundr | . zems  | .        | . zamîn   | .       |
| eat      | . yâu   | . khhor | . khâr   | . khvar   | .       |
| eight    | . hât   | . wokht | .        | . hat     | . ashká |
| eye      | . chözm | . tsem  | . chhem  | . sám     | . chám  |
| eye-brow | . varào | . varào | . patis  | . vurichh | .       |
| eye-lash | . skord | . yéid  | . posich | . pátak   | .       |

**F.**

|                        |         |        |       |          |         |
|------------------------|---------|--------|-------|----------|---------|
| father                 | . tát   | . pid  | . dád | . tat    | . tát   |
| feet                   | . püdth | . pedh | . pád | . pùd    | . palah |
| female (of<br>animals) | . stréi | . stir | .     | . shisch | . meyah |



| English. | Wakhi.    | Sarikoli.  | Shighnan.   | Sanglich.                         | Minjan.    |
|----------|-----------|------------|-------------|-----------------------------------|------------|
| finger   | . yangl   | . ingakht  | .           | . ingit                           | . ankardia |
| fire     | . rakhnig | . yuts     | . yáts      | . { roshnái . yúr<br>. { shunai . |            |
| five     | . pānz    | . pinz     | .           | . pānz                            | . pānch    |
| flesh    | . gusht   | . gūkht    | . goft      | . púdaf                           | . ghosh    |
| flock    | . bakhsh  | . tup      | .           | . bachùn                          | .          |
| flour    | . yumj    | . yogj     | . yavàj     | .                                 | .          |
| fly      | . maks    | . chingin  | .           | . pashai                          | . mogha    |
| forehead | . rùk     | . ràk      | .           | . peshàni                         | .          |
| fore-arm | . yurm    | . cherost  | .           | . kàki                            | .          |
| four     | . tsabür  | . tsavur   | .           | . safor                           | . chafîr   |
| frog     | . mukt    | . khar-béj | . sher-bich | .                                 | .          |
| fuel     | . ghûz    | . zez      | . zíz       | . yùr                             | . ezma     |

## G.

|                         |          |          |             |          |          |
|-------------------------|----------|----------|-------------|----------|----------|
| ghee (but-<br>ter)      | . rughn  | . ràun   | .           | . regh   | . roghún |
| go                      | . chāu   | . sò     | . sah       | . shóh   | . áí     |
| goat <i>or</i><br>sheep | . tugh   | .        | . *(ma)dugh | .        | .        |
| he goat                 | . tugh   | .        | .           | . katao  | . charva |
| she goat                | .        | . vāz    | .           | . vuz    | . vorah  |
| good                    | . bāf    | . charj  | . bashand   | .        | .        |
| grandfa-<br>ther        | . pūp    | . bāb    | .           | . bāvā   | .        |
| grass                   | . wush   | . wukh   | . vāksh     | . ósh    | .        |
| ground                  | . wundr  | . zems   | . zamt      | .        | .        |
| gun                     | . miltek | . miltek | . san       | . miltak | .        |
| gun pow-<br>der         | . dāru   | . dāru   | .           | . dárú   | .        |

## H.

|       |          |          |                |           |            |
|-------|----------|----------|----------------|-----------|------------|
| hair  | . shāfsh | . khād   | . dáks         | . ghunyāk | . pogha    |
| hand  | . dhast  | . dhüst  | .              | . dāst    | . lást     |
| head  | . sār    | . kâl    | . kal          | . sár     | . (po)sar† |
| heart | . püzūv  | . zârd   | . zâro(?zârd)‡ | . uzdaí   | . zíl      |
| hen   | . makian | . makian | . chhash       | .         | .          |

\* The syllable *ma* is probably not in reality a part of the word. Perhaps the Munshi's informant said "my goat", and the whole was entered as one word.

† The syllable *po* is perhaps a pronoun entered by mistake as a part of the word.

‡ Query زارو (*zâro*), by mistake for زارد (*zârd*) ?



| <i>English.</i> | <i>Wakhi.</i> | <i>Sarikoli.</i> | <i>Shighnán.</i> | <i>Sanglich.</i> | <i>Minján.</i> |
|-----------------|---------------|------------------|------------------|------------------|----------------|
| here, hither    | dram          | . àud            | .                | .                | . mala         |
| hold            | . wüdhür      | . wadhor         | .                | .                | . ghorya       |
| honey           | .             | .                | .                | .                | . agman        |
| horse           | . yàsh        | . vurj           | . varch          | . voràk          | . yàsap        |
| house           | . khhun       | . chéd           | . chet           | . khàn           | . kéi          |

# I.

|            |           |        |          |   |   |
|------------|-----------|--------|----------|---|---|
| intestines | . shingör | . raud | . durmún | . | . |
|            |           | darün  |          |   |   |
| iron       | . ishn    | . spin | . sapsan | . | . |

# K.

|       |        |        |        |        |   |
|-------|--------|--------|--------|--------|---|
| knee  | . brin | . zân  | . zûn  | . zong | . |
| knife | . kôz  | . chög | . ched | . kirh | . |

# L.

|       |                |             |             |        |   |
|-------|----------------|-------------|-------------|--------|---|
| light | . vòin         | . vòin      | . roshnagah | .      | . |
| lip   | . lafeh,       | . pàuz      | . ghîb (?)  | . làw  | . |
|       | lav            |             |             |        |   |
| loin  | . malung yàich | madhân khoj | .           | . mîda | . |

# M.

|        |                      |          |          |          |          |
|--------|----------------------|----------|----------|----------|----------|
| male   | . ghösch             | . niér   | .        | . narak  | .        |
| man    | . dhài               | . chûrik | . chàrak | .        | .        |
| many   | . ghafch             | . hûch   | . lab    | .        | .        |
|        | lup ( <i>great</i> ) |          |          |          |          |
| milk   | . zarz               | . khevd  | .        | . khatab | . khshîr |
| moon   | . zûmàk              | . mäs    | . mâesit | . dulmik | . yômghâ |
| mother | . nân                | . anâ    | . nan    | . nan    | .        |
| mouth  | . ghâsh              | . ghov   | .        | . fotsah | . yûrab  |

# N.

|               |           |           |        |           |            |
|---------------|-----------|-----------|--------|-----------|------------|
| nail (finger) | .         | .         | .      | . narkhak | .          |
| neck          | . gardhân | . gardhân | .      | . ghurúk  | .          |
| needle        | . sits    | . sits    | . saj  | .         | .          |
| night         | . nâghd   | . khâb    | .      | . forshuk | . khashâwa |
| nine          | . nao     | . néw     | .      | . nao     | . nao      |
| nose          | . mis     | . nâz     | . nids | . fusik   | . foska    |



*English. Wakhi. Sariqoli. Shighnan. Sanglich. Minjan.*

## O.

|     |          |        |   |          |               |
|-----|----------|--------|---|----------|---------------|
| one | . iv     | . iv   | . | . vāk    | . yao (? iw)* |
| ox  | . druksh | . khez | . | . chārva | . koya        |

## P.

|        |         |           |          |       |        |
|--------|---------|-----------|----------|-------|--------|
| pigeon | . kībit | . chabāud | . chapūd | .     | .      |
| pot    | . lut   | . liet    | .        | . māl | . tāla |

## Q.

|       |          |          |       |   |   |
|-------|----------|----------|-------|---|---|
| quilt | . sirekh | . siregh | . lef | . | . |
|-------|----------|----------|-------|---|---|

## R.

|       |          |          |         |          |          |
|-------|----------|----------|---------|----------|----------|
| rain  | . wūr    | . wareij | .       | . nok    | . neoda  |
| rat   | . pūrkh  | . pūrg   | . purg  | .        | . yārgħ† |
| red   | . sōkr   | . rūsht  | . risht | .        | .        |
| ribs  | . pūrs   | . pala   | .       | .        | . alikha |
| river | . darya  | . daryā  | .       | . darya  | .        |
| robe  | . chapān | . chapān | .       | . shoi   | .        |
| roof  | .        | .        | .       | . kiskur | .        |

## S.

|              |               |           |         |            |            |
|--------------|---------------|-----------|---------|------------|------------|
| saddle       | . pōdhn       | . bidhān  | . bedān | .          | .          |
| salt         | . nimak       | . nimadhj | .       | . namolgha | . namālgha |
| seven        | . hūb         | . üvd     | .       | . hoft     | . odh      |
| sister       | . khūi        | . yākhkh  | .       | . ikhva    | . yakhva   |
| sit          | . nōzd        | . nīth    | . nis   | .          | .          |
| six          | . shādh       | . khhéel  | .       | . khoār    | . akhshi   |
| shoulders    | . fiāk        | . sevd    | . fiyak | . syúd     | .          |
| sky          | . āsmān       | . āsmān   | . asmān | . asma     | .          |
| sleep        | . yünūk       | . khhūdhm | shāftis | .          | .          |
| sleep (imp.) | rukhp         | . khūfs   | .       | . mes      | . nalva    |
| small        | . dzaklai     | . dzül    | . ghada | .          | .          |
| snake        | . fuks        | . tafūsk  | .       | .          | . yiz      |
| snow         | . zam         | . zamān   | . zanj  | . varf     | . vārfa    |
| sole         | . pasht       | . naburg  | .       | . pūdāsh   | .          |
| son          | . pōtr, zamān | pōts      | . pots  | . zamānak  | . pūr      |

(child)

|          |          |          |           |           |          |
|----------|----------|----------|-----------|-----------|----------|
| stand up | . warefs | . warāfs | .         | . tas     | . ushka  |
| star     | . stār   | . khturj | . ishtīrz | . ustūrak | . astari |

\* The Munshí took down *يو*. This should perhaps have been *يو*. (In Wakhi the Munshí spells this word likewise *يو* 'yao', while it is there decidedly pronounced 'iv').

† Perhaps this should be *پارغ* (*pārgħ*), instead of *يارغ* *yārgħ*.



*English. Wakht. Sarikolí. Shighnán. Sanglich. Minján.*

|         |             |          |            |                   |         |
|---------|-------------|----------|------------|-------------------|---------|
| stomach | . wanj, dur | . kech   | . hazàrjúl | .                 | .       |
| stone   | . ghar      | . zèr    | . zìr      | . song            | . koika |
| sun     | . yir       | . khhèr  | . khir     | . álmán,<br>urmuz | . mera  |
| sweet   | . khhuzg    | . khhegh | . khaish   | .                 | .       |
| sword   | . shop kōz  | . khub   | shap-ched  | .                 | .       |

## T.

|              |            |           |           |           |          |
|--------------|------------|-----------|-----------|-----------|----------|
| teeth        | . dündük   | . dhándán | .         | .         | . lánd   |
| ten          | . dhas     | . dhes    | .         | . dàs     | . dah    |
| turban       | . sallà    | . dastûr  | .         | . lataí   | .        |
| thigh        | . lang     | . bikhtun | . bastún  | .         | .        |
| three        | . trûi     | . haròi   | .         | . tràí    | . sharaf |
| thread       | . zûtr     | . vûrgh   | . vudrash | .         | .        |
| throat       | . alqum    | . alqüm   | .         | . ghàr    | .        |
| tongue       | . zik      | . ziv     | . zeb     | . zulúk   | .        |
| trousers     | . shawàlak | . shim    | .         | . var     | . shoál  |
| trouser-band | .          | .         | .         | . valvâsh | .        |
| two          | . búi      | . dhao    | .         | . dú      | . do     |

## U.

|    |        |       |   |        |          |
|----|--------|-------|---|--------|----------|
| up | . wuch | . tèr | . | . vráz | . valgha |
|----|--------|-------|---|--------|----------|

## V.

|      |   |   |   |       |   |
|------|---|---|---|-------|---|
| vein | . | . | . | . reg | . |
|------|---|---|---|-------|---|

## W.

|                |           |          |              |           |            |
|----------------|-----------|----------|--------------|-----------|------------|
| water          | . yupk    | . khâts* | . shads      | . vik     | . yàogha   |
| water-mill     | khadhorg  | khadhòrj | .            | . khadàri | . khàirgha |
| way            | . vadhak  | . pând   | .            | . pànda   | .          |
| went           | . ragd    | . sût    | .            | . shet    | .          |
| wheat          | . ghidim  | . zandam | . zandum     | . ghandam | . ghandam  |
| where, whither | . kum-jài | . ko-jûi | .            | . ko-jui  | . ko       |
| white          | . rukhn   | . spèid  | .            | . ispèd   | . sùpi     |
| who            | . kúi     | . chòi   | .            | .         | . kad      |
| woman          | . kōnd    | . ghin   | . zind, ghín | . kóch T. | . zinga    |
| wood           | . shung   | . khüng  | .            | .         | . iskavat  |

## Y.

|        |        |        |                      |   |
|--------|--------|--------|----------------------|---|
| yellow | . zard | . zird | . zírú (? زيرد zird) | . |
|--------|--------|--------|----------------------|---|

\* It will be remembered that in Sarikolí *kh* stands for *sh*. The word *khâts* (*shâts*) therefore is very like the Shighni *shads*.

N. B.—I have not thought it necessary to mark the words which have a more or less close resemblance to Persian.



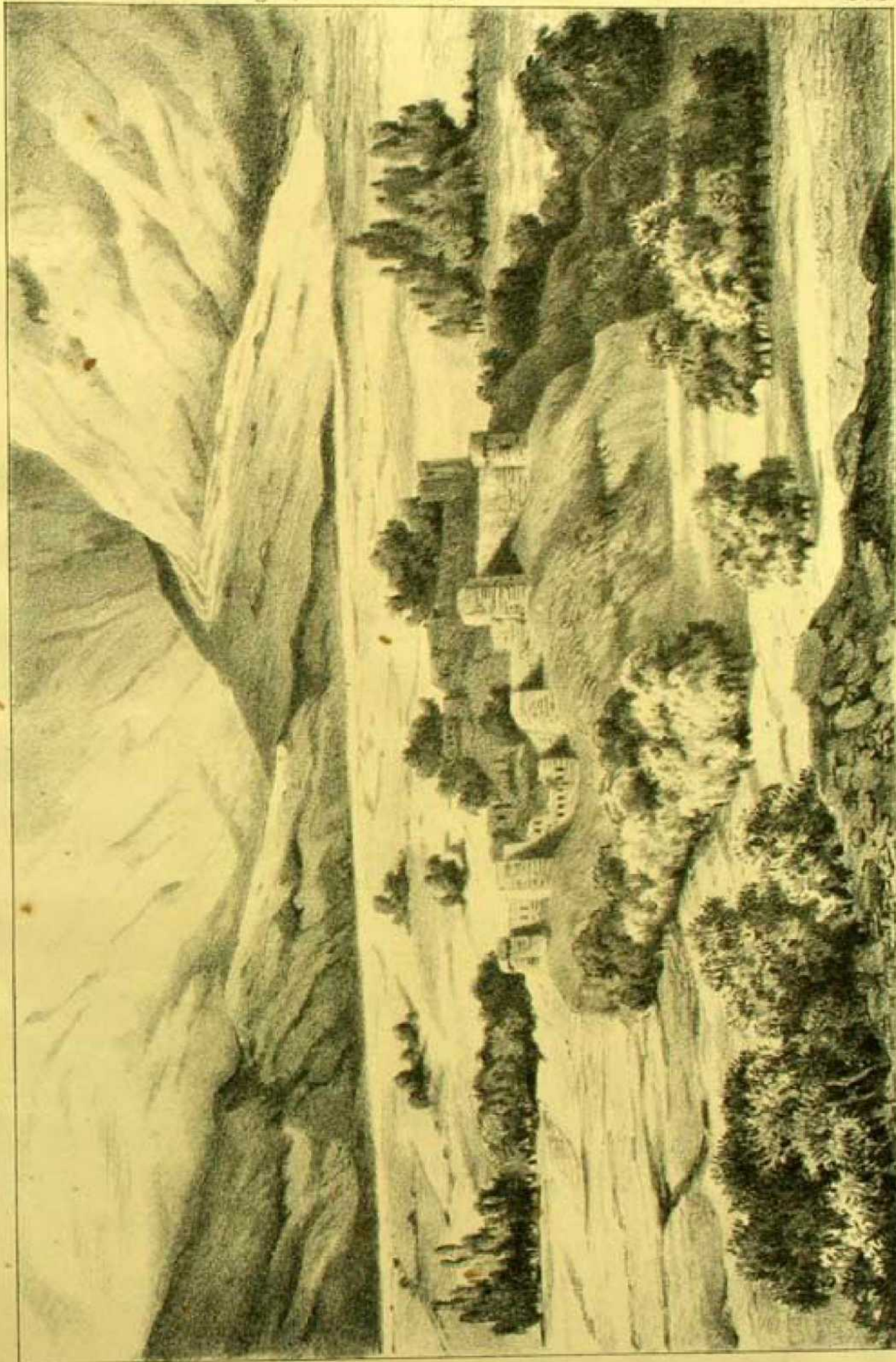
## ADDENDA.

The following words may be added to the 'Comparative Table, shewing the connection of the Ghalchah Languages with neighbouring Tongues'—

| ENGLISH.  | INDIAN.         |                | GHALCHAH. | PERSIAN.        |                |
|-----------|-----------------|----------------|-----------|-----------------|----------------|
|           | <i>Ancient.</i> | <i>Modern.</i> |           | <i>Ancient.</i> | <i>Modern.</i> |
| pine-tree | . pita          | .              | . pit     | .               | .              |
| wool      | . ūrna          | . ūn           | . wân     | .               | .              |
| smell     | . baodha        | . bo           | . bao     | . baodha        | . bū           |

---





VIEW OF GAOKUCH.

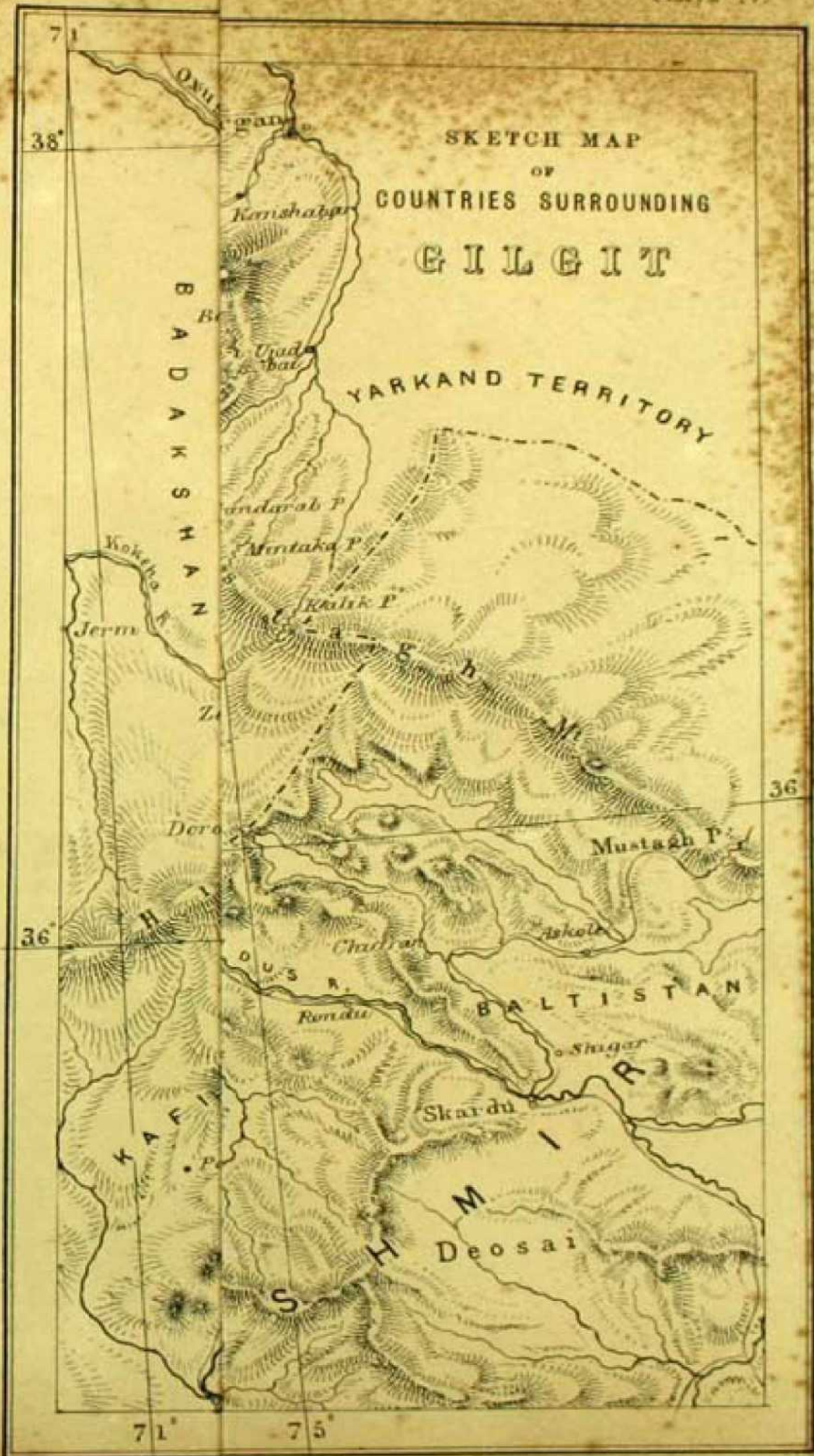
(From a painting by Capt. T. R. Davidson & a drawing by Capt. Marsh.)





VIEW OF MAZENA PASS.  
(From a painting by Capt. T. R. Davidson & a drawing by Capt. Marsh.)









# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

Part I.—HISTORY, LITERATURE, &c.

No. III.—1876.

*Popular Songs of the Hamirpur District in Bundelkhand, N. W. P.*  
No. II.—By VINCENT A. SMITH, B.A., C.S.

In fulfilment of the promise which I made in my paper on the Songs in honour of Hardaul, I now submit to the Society some further specimens of the popular songs of Bundelkhand. Very little attention has hitherto been paid to the variety of Hindí spoken in this province, and few or no specimens of it have as yet been published; I hope therefore that the specimens which I am now placing on record, and which in general accurately reflect the popular speech, will not be without value to the lexicographer and philologist, and that besides their philological value the songs will not appear devoid of interest on other grounds.

The songs in common use among the people are almost infinite in number, and might be divided into various classes. The selection which I have made for the present paper, consists entirely of Caste Songs, that is to say, songs which describe, or specially refer to, the occupations and characteristics of the caste of the singer. Such songs are sung on various occasions, but are I am informed seldom sung except in presence of the members of the caste to which the song refers, and to which the singer belongs.

Of the twelve songs now translated, eleven were collected during the last rainy season at my request by Paṇḍit Murlí Dhar in his native town Maudhá and the neighbouring villages. The Lodhí's Song, No. X, was lately obtained by him from a Lodhí resident in Panwári, the south-western parganah of this district. None of these songs appears to have been ever before reduced to writing, and they have now been taken down exactly as



pronounced; I am satisfied that no corrections nor amendments have been introduced. Although the specimens which I have selected for publication happen all to be songs of the inferior castes, it must not be supposed that these Caste Songs are known only to the lower classes, for I possess Brahman, Rájput, Baniyá, and Káyath songs of the same kind.

My translations are all literal; one song only, *viz.*, that of the Khangárs, No. VIII, I have rendered into rhyme as an experiment, but in general I am inclined to think that a prose translation is preferable: many of these songs indeed are not capable of being rendered into English verse with any approach to accuracy.

The first three songs, namely the Goldsmith's, Blacksmith's, and Carpenter's are specimens of a numerous class, and consist of little more than a rhyming catalogue of the goods made or the wares sold by the singer's caste fellows. My collection comprises similar compositions sung by the Halwái (confectioner), Bharbhúnjá (grain-toaster), Tamoli (*pán*-seller) and other castes. I need hardly observe that in India generally each trade forms a separate caste.

The *Kahár's* song (No. IV) is a grumbling lament over the hardships of the life of the carrier of burdens, which will be readily appreciated by all who have ever travelled in a *pálki*.

The Barber's and the Khangár's songs (Nos. V and VIII, respectively) are somewhat satirical, and note with amusing candour some of the less creditable characteristics of those castes.

The Khangárs,\* now a low and despised race, and often acting as menials of the zamíndárs of the higher castes, once played an important part in the history of Bundelkhand, and held state at Karár, 17 miles from Jhánsí, whence they were expelled by the Bundelas. They are still the zamíndars of some villages in the Jhánsí and Hamírpur districts, but in the greater part of Hamírpur, they hold the office of village watchmen, and enjoy the reputation of being as great thieves as any of those whom they are set to watch.

In Parganah Jaitpur, the Basors or sweepers replace the Khangárs as the village watchmen, and everywhere they are employed as basket-makers and musicians. They are spoken of indifferently as Basor, Basor, or Dumár, and sometimes the name Dom is used for this caste. I am not at present able to say whether the sweepers of this district are identical or not with the Doms of the Benares Province; the latter people occupy a position still more degraded than that of the ordinary sweeper, and are often homeless vagrants. In his song (No. IX), the Basor claims for himself a much better character than the Khangár can pretend to.

\* For notes on the Khangárs see N. W. P. Gazetteer, Vol. I, pp. 19, 162, 295, 351, and Beames' Elliott, Vol. I, App., p. 347.



The Kol's Song (No. VI) was obtained from a solitary old Kol labourer who has been residing for some years past in Mauza' Bakcha Chháni in Parganah Maudhá. The village traditions show that long ago the Kols shared along with Gonds, Bhíls, Bhars, and other aboriginal tribes much of the soil of the Hamírpur district, from among the permanent inhabitants of which they have now entirely disappeared, though considerable numbers of the tribe still exist in the hilly parts of the adjoining Bandá district.

The Kol's song appears to me to be one of the most interesting in my collection, and the distinct expression which it gives to the feeling of defiance and distrust with which the savage regards the civilized man, is very remarkable. The language of the song is unusually Sanskritised, but its general meaning would be intelligible to any rustic. Probably in spite of his antipathy to "the men who abide in towns and villages", the Kol composer felt his dignity enhanced by a display of his command over the fine words of the race which he despised.

The song of the Naṭs, (No. VII) who seem to be much the same in this district as elsewhere, calls for no special explanation. Other wandering tribes, specimens of whose songs I possess, are the Beriyás, Kapariyás or Kapar-Mangtás, and the Khunkhuniyás or Ahír-Mangtás.

The \*Lodhís' Song (No. X) is a faithful picture of the mode of life of the members of the Lodhí caste, a most important element in the population of the Hamírpur district, especially in the Parganahs of Ráth, Panwá-  
rí, and Jalálpur. The Lodhís or Lodhas (= Sanskrit *Lubdhaka*) may perhaps be the representatives of a non-Aryan tribe: so far as I have yet ascertained, it appears that they entered the Hamírpur district from the west, and settled in a few villages, from which they colonized numerous others, gradually expelling by force of arms the Bhars and other earlier inhabitants. A curious bronze plate inscription which I lately obtained, records a victory of the Lodhís over the Bhars in 1404 Samvat = 1347 A. D. The Lodhís are excellent cultivators, and in this part of the country are almost the only people who know how to utilize water for irrigation, and to grow sugarcane successfully; in all their labours they are actively assisted by their women, but the description in the song must not be taken as meaning that while the women work, the men are idle, for both sexes are industrious. In Ráth and part of Panwá-  
rí, the zamíndárs of most of the villages are Lodhís, but their women are not too proud or bashful to work hard in the fields, and it is on this peculiarity that the song lays stress.

The popular songs of Northern India do not testify to such a profound

\* According to the census of 1872 there are 58,034 Lodhís in Hamírpur district. The caste is more numerous in Etá only, where there are 73,873. See N. W. P. Gaz., Vol. I, pp. 162, 208, 331.



and widely diffused moral and religious sentiment as do those of the \*Dravidian peoples, but songs containing an allegory or a moral are numerous. The Oilman's Songs, Nos. XI and XII, are specimens of this class: my collection includes similar songs of the Kewat (fisherman), Málí (gardener) and Kori (Hindú weaver) castes, some of which, as does No. XI, profess to be the composition of Kabír,† and others claim to be the work of Tulsí Dás. There are I believe a good many disciples of Kabír in the district, chiefly among the lower classes. The Oilman's Songs are printed as recited by a Teli of Maudhá; the same songs when recited by a native of Hamírpur differed only by the substitution of '*bhargayo*' = 'tired', for '*girgayo*' = 'fallen', in line 2 of No. XI, and in the transposition of the words *milaniyán* and *chikaniyán*.

I still refrain from making any detailed examination of the verbal forms in these songs, in the hope of being able to examine the Bundelkhand dialect and sub-dialects at another time with the help of fuller materials.

It is necessary, however, to observe that the more characteristic forms and words of Bundelkhandí must be sought for in the southern parganahs of the British districts of Hamírpur, Bandá, and Jhánsí and in the adjoining native states. The speech of the Lodhís, of which song No. X is a specimen, has some peculiarities of its own. The forms of Hindí spoken in Parganah Maudhá in the east of the Hamírpur district, are intermediate between the dialect of the Doáb and that of southern Bundelkhand, and the songs now published are all (except No. X) specimens of this intermediate variety of Hindí. ‡The Hardaul songs which formed the subject of my last paper, were obtained from a Káyath woman in Hamírpur; and there is not much difference in the forms used in the Parganahs of Hamírpur, Sumerpur, and Maudhá.

### I. The Suna'r's (Goldsmith's) Song.

#### सुनारों का गीत ।

सुनरा बैथो टाट दिहार्  
बाखर मँझ डार सब स्वाखर गुरमी बीच आग सपचार्  
लै सुनार नल फूकन लाग्यो आगी आगे गाड़ निहार्  
घरिया मँझ डारकर सोना चाँदी दोनोँ दिये गलार्  
फिरलै परगछनी में डारे ठंडे जल में लिये बुझार्

\* See Gover's Folk Songs of Southern India *passim*.

† For some account of Kabír see Introduction to Dr. Fallon's New Hindústání Dictionary, pp. VIII to X.

‡ In my last paper I overlooked a paragraph in Beames' Elliott, Vol. I, p. 269, which gives a brief notice of the Hardaul legend, differing in some respects from mine.



1876.] V. A. Smith—*Popular Songs of the Hamirpur District. No. II.* 283

लियो उठाय ज्यौरा सुन्दर अब सरिया पर परी कुटारै  
 कूटकाटकर गढ़े मनोहर गहना कारीगरी दिखारै  
 बकरा बिछिया कड़ा अनौटा रुचि र भौंभ रची चितलाई  
 पायजेव बढमोल बनारै घुंघरू एक हजार लगाई  
 बने पैजना अधिक ढंगीले इस र शब्द रछो मग जारै  
 साँकर देखि खोलकर साँकर पर्दवार टकटकी लगाई  
 देखि जंजीर करगता मोतीचूरदार दोलड़ी सुहारै  
 घुंघरूदार जमेल बिलोकत चौकी देखत मन ललचारै  
 कंठा हार पचलड़ी मोहनमाला गुंज गोफ गहवारै  
 सेली कंठी इला मुदरी आगुरतान आरसी बनारै  
 चूड़ा पटा पहेलवा ककना जरैया बंगली मनभारै  
 बाजूबन्द बज्जा जोशन बडटा ठाँई रचे बनारै  
 नयुनी बेसर औ लटकौवा पछिरतही मुख इबि बढजारै  
 करनफूल अब डार पुंगरिया बेदी पत्ता रवा जमारै

The Sunár sits with his mat spread,

With all his \*iron tools in his wallet, and in the earthen bowl fire brightly kindled ;

Taking his blowpipe the Sunár begins to blow the fire, having fixed the anvil in front.

Into the crucible he throws silver and gold and melts down both,

Then takes them out, casts them into an iron trough, quenches them in cold water ;

He uplifts his good hammer, and on the ingot fall many blows.

By dint of hammering and cutting are fashioned pretty ornaments, the worker's skill is shown ;

Rings† for second toe, rings for little toe, plain anklets, rings for big toe, and hollow tinkling anklets are worked at steadily and heartily ;

*Páejeb*‡ of great price are made, fitted with a thousand bells,

*Paijánás* turned out very handsome, the sound of tinkle tinkle was heard all along the road.

Seeing the§ twisted ankle-chain, the woman from behind the screen opened the door-chain and staid gazing ;

The plain linked chain, and the zone with round links and double band were graceful in her sight,

\* *Lwákhar* = lokhar, i. e. iron tools : *wá* is frequently substituted for medial *o* and *yá* for medial *e*.

† The enumeration of personal ornaments begins with those of the feet and so upwards to those of the ears.

‡ *Páejeb* and *paijánás* are varieties of ankle ornaments.

§ In the original the same word '*sánkar*' expresses both kinds of chain.



284 V. A. Smith—*Popular Songs of the Hamirpur District. No. II.* [No. 3,

Beholding the *hamel*\* with bells, and seeing its square pendant, her mind is delighted :

[Also† when beholding] gold necklet, necklace, five-stringed necklace, coral and gold necklace, *gunj* and *goph*, all weighty,

*Seli*, *kanthi*, plain ring, signet ring, thumb-ring, manufactured finger mirror ;

*Chúrá*,‡ *paṭá*, *pachhelawá*, *kakaná*, *harraiyan*, charming bangle,

*Bájú-band*,§ *bajullá*, *joshan*, *bahutá*, *ṭánr* carefully made,

Nose-ring, heavy nose-ring, and pendant, by wearing which the charm of [the wearer's] face was increased :

Also *karanphúl*|| and *dhár*, nostril-ornament, fillet, and *pattá* adorned with granules of precious metal.

## II.

### The Luha'r's (Blacksmith's) Song.

#### लुहारों का गीत ।

फूकत आग लुहार लुसारी  
 लै धौकनी बैठ यक पावे आगे एक निहारै गाड़ी  
 लोहा तपा निहारै पर घर तापर परी घनन की मारी  
 खुरपा खुरपी चंसिया तकुवा बनगये तवा फावड़ा कुदारी  
 चिमटा बुरी कड़ाह हथौरा संडासी चौ बुरा कुल्हारी  
 बरमा कौटा जंजीर कौंदा चरई कुसिया पौंस सेंबारी  
 आरा सुघर दतील घनीला जिसने अमली की जड़ फारी  
 येँथा भौंभा लोल करहुली चाकू बिहुवा परं कटारी

The Luha'r blows his forge fire,

Holding the bellows one man sits behind, in front another where the anvil is fixed,

\* *Hamel* a sort of necklace made of rupees generally, and furnished with a pendant ; also known in other districts as *haikal*.

† The construction of the sentence here is rather obscure, but the word *dekhi* seems to be carried on to the following lines. This line enumerates various kinds of neck ornaments ; *seli* and *kanthi* are similar articles.

‡ *Chúrá*, etc., these are all kinds of bracelets : the *harraiyan* is worn next to, and the *pachhelawá* farthest from, the hand.

§ The ornaments enumerated in this line are worn on the arm above the elbow.

|| *Karanphúl* and *dhár* are kinds of earrings ; the *pattá* is worn in the upper part of the ear.



1876.] V. A. Smith—*Popular Songs of the Hamirpur District. No. II.* 285

The heated iron being placed on the anvil, on it fall the sledge-hammer blows ;

*Khurpá,\* khurpi*, sickle, spindle, baking-plate, *pháorá, kudári*, are made,

Also tongs, knife, boiling pan, hammer, forceps, and razor and axe,

Drill, nail, chain, hasp, ox-goad, ploughshare, share of *bákhart*† plough are constructed ;

Also the saw, well made and closely toothed, which severs the root of the tamarind tree ;

*Thenthá,‡ jhánjhá*, plummet, iron-ladle, clasp-knife, iron-claw, battle-axe and dagger.

### III.

#### The Barhai's (Carpenter's) Song.

बढ़इयाँ का गीत ।

बढ़ई काठ सुधारनद्वारा

साखू और शीशम चीड़ फारकर द्वारा

देहली सुघर डुरौघ बनाया बाजू और किवारा

पाटी सिरा भवाँये पाया बचि २ पलंग सुधारा

चौकी तखत कलन्दरगाही पिदुली पाँव पसारा

पीढ़ा माची उड़नखटोला छिछोला गददारा

मेना और पालकी खंभा कौवर गोलगरारा

भाति २ के गद्दे कठौता कठवाकोलनद्वारा

The Barhai is a good worker in wood,

*Sákhú,§ Shísham*, and teak timber he splits and cleaves,

Well made door-step, lintel, door-posts and doors he makes,

Having prepared side-pieces, head and foot pieces, and turned feet he constructs a bed-stead,

Chairs, and thrones fit for Kalandar Sháh, and block stools on|| which you could stretch your legs,

\* *Khurpá, khurpi, pháorá, kudári*—the well known tools which supply the place of the English hoe, spade, and pickaxe.

† The *bákhart* is an instrument peculiar to, or at least chiefly used in Bundelkhand. It is employed to take the hard surface crust off fields, and to clear away surface weeds.

‡ *Thenthá* is an instrument with a flat blade and long handle, used in cooking, to press down cakes, etc., on the pan. *Jhánjhá* is a perforated ladle.

§ *Sákhú*, a forest tree : *shísham* or *sirsat* = *Dalbergia Sissoo (Roxburgh)*.

|| This seems to be the meaning of the words *páñu pasárd*.



286 V. A. Smith—*Popular Songs of the Hamirpur District. No. II.* [No. 3,

Large stools, four-legged stools, 'flying cots'\* and swings he constructs,

Curtained *pálkis*, and ordinary *pálkis*, poles and *bahangis*† and round well-pullies,

Of all sorts he makes, also wooden bowls :—he knows how to hollow timber.

#### IV.

#### The Kaha'r's (Bearer's) Song.

#### कहारे का गीत ।

सबसे उद्दिम बुरा कहारी

काँवर घड़ा पालकी डोवत काँघ टूट भर खपरी कारी

जहाँ भर डंक में देरी तहाँ चलत जून सहे मारी

सब बरात में बाहन पावै आप और को देत सवारी

Of all trades the worst is the Kahár's ;

With carrying *bahangis*, pitchers and *pálkis*, his shoulders get broken and his skull blackened :

Whenever delay occurs in the stage, then straightway the slipper is applied, and he must put up with abuse.

All men in a wedding procession get carriage, he himself has to carry others.

#### V.

#### The Na'i's (Hindu' Barber's) Song.

#### नाइयो का गीत ।

सबसे नार बड़ा खिलाड़ी

लेकर भिल्ली नहरनी बूरा करी तयार बुराड़ी

चोटी पकड़ सबों को मूँड़ा बगल मंझ औ डाढ़ी

गोलाफिरवा गिर में रखकर कलम नुकीली काढ़ी

मूँड़ कर पेट चलावै खेती करै न बारी

पेटी बगल दबाकर छोटा हाथलिये राजमारी

Of all men the barber is the greatest trickster,

With his whetstone, nail-parer, and razor, he gets ready his tool bundle ;

\* The words *uran khaṭolá* are explained to me as being used in a proverbial sense to mean 'very fine cots', i. e. as good as those which are described in fairy tales.

† *Kánwar* means the same as *bahangi*, the well known pair of baskets slung from a pole, so much used in India.



1876.] V. A. Smith—*Popular Songs of the Hamirpur District. No. II. 287*

He catches people by the top knots, and \*clean shaves them—armpit, moustache, and beard,

Leaving a round tonsure on the head, he points off the side locks,

By clean\* shaving he fills his belly, neither field nor garden has he ;

With his bundle† under his arm and his brass water-pot in his hand, he gets his living.

## VI.

### The Kol's Song.

#### कोलों का गीत ।

देखऊ बनवासिन की रीती

गिर कन्दरन वसहिँ दिन राती कबऊँ न कोल उठावहिँ भीती

जो नर रहत नगर घामन में तिन की कबऊँ न करहिँ प्रतीती

डोरा सदा राहगीरन को लूटहिँ झाड़ धर्म अर नीती

सपनेऊँ अन्न देख नहिँ पावत बनफल खात जन्म गयो बीती

कोलन माँझ छात मुखिया बह जायो मुकहिँ न सब मिल जीती

Behold the ways of the dwellers in the woods !

In hills and caves they dwell, never neither for night nor day build the Kols a wall,

In men who abide in towns and villages never will they put trust,

The camp of travellers they always plunder, regarding not the law of God nor man ;

In dreams even, corn they never see, wood fruits they eat—so their life passes.

Among the Kols the Chief is he whom all men united cannot subdue.

## VII.

### The Nat's (Juggler's) Song.

#### नटों का गीत ।

बाँस गाड़ नट नाच दिखावत

कलाजंग कुलहटी बाँस पर मारत चाप और को सिखावत

जैसे नचत किलकिला नभ पर ऐसेहि नचत गीत बड गावत

देखत जहाँ डोल कहु सुन्दर तहाँ टिक जात आवनी आवत

The Nat plants a bamboo pole and shows off his dancing,

\* *Múgrá* = 'clean shaved', with a double entendre.

† *Petī* means the same as *chhurágrī* in line (2) of this song.



Aerobatic and tumbling feats he performs himself upon the pole and teaches to others,

As the kingfisher dances in the sky, so he while dancing sings many songs :

Wherever he sees a good opportunity, there he halts and roosts himself in.

### VIII.

#### The Khangar's Song.

##### खंगारों का गीत ।

देखउ खंगरन की चतुराई

घोड़ा धिमे\* पैकिधा खेलै\* गावहिं गीत डोलकी बजाई

चौकी देखिं चोर को ताकै\* कबहुं आप खुद लेहिं चुराई

खोरनर फिरहिं रात दिन घूमर चौकसी दिखाई

How smart the Khangar is who can tell ?

He can groom a horse and play tumbler as well,

He can sing a song and perform on the drum,

And while watching the thief, himself steal some :

From lane to lane he prowls on his way,

And is ever watchful night and day.

### IX.

#### The Duma's (Village Sweeper's) Song.

##### डुमारों का गीत ।

सबसे अधिक बसेड़ा कमाऊ

झींटा टुकना दौरा थोड़ी पंखा बिनत करत मन चाक

बेचत दाम लेत नगदौवल राखत मन में हरप उझाल

डफुला डोल नगाड़ा सुन्दर मदत न कहु जिय करत दुराक

सब बाजा निज हाथ बजावत बेसुरी सुनतन बढ़त उमाल

खोरन को मैला निस बासर साफ करत नहिं मन दुरभाक

Of all men the Basor is the best worker,

\* *Chhīntā*, *tuknā*, *daurī*, and *orī* baskets and fans he plaits willingly,

He sells for cash down and keeps in jolly good spirits,

Tambourines, drums, and kettle-drums he covers nicely with leather,  
and he has no thoughts hidden ;

\* *Chhīntā* = a broad shallow basket ; the word is used in line (3) of Song No. X.  
*Tuknā* = a smaller basket used for grain, etc. *Daurī* = the flat basket used for irrigating and other purposes. *Orī* = a very large basket.



All instruments he plays with his own hands, those who hear his flute are much delighted.

Night and day he clears away dirt for other people, and never shows ill-temper.

# X.

## The Lodhi's Song.

### लोधियों का गीत ।

लोधन के घर लोग लुगई  
 लोगवन डार मारकर कुछा चुरियन देकर ढांक पतार  
 पार लौंड़ियै मिर धर झीटा डार गल्याफौ रव्वार बिहार  
 खुरप९ कै भीलभाँखरौ खरौ चाँदकै करत निदार्  
 कोदवन के खाटा चौ लचका डुभरी लाटा खाय बनाई  
 तरसा नचे रचट पुर चाँकै करै बराही कै मिचवाई  
 खाँड़ो डार गुजरियाँ चुन्ना बिरथा सचै कुवभ गरवाई  
 लोधवा लोगवाग सब मिलकै खाये लुधिनियन को जू कमार

The Lodhis' house-folk\* are their women,—

[The Lodhi woman] putting men aside, girt with her waist-cloth,† packing‡ *dhák* leaves between her bangles,

Puts her little girl to bed in a basket on her head, with a wrapper above and a cloth spread underneath ;

Stubbing up briars and brambles, and scraping up grass, she does her weeding ;

*Kodo*§ bread, and gram pottage, *mahuá* paste, and *mahuá* sweetmeats she makes and eats ;

Attaching the bucket, she works the Persian|| wheel and well, and waters the sugarcane ;

\* *Log* or *lugwá* (and in *Maudhá lugawá*) means here 'males' as distinguished from *lugá* 'women', and the words are so used in common speech.

† *Kusfá* = the waist-cloth, but little fuller than a man's *dhoti*, worn by adult women of the lower castes, and by young girls of the higher castes in Bundelkhand ; it leaves most of the leg bare.

‡ i. e. to prevent the bangles from being troublesome and interfering with her work. The form *patái* seems to be used only for the sake of the rhyme.

§ *Kodwan* is plural. *Rudfá*, not *rofdá*, is always used to mean bread made of *kodo* or *sáwán*. The *mahuá* (*Bassia latifolia*) is very abundant in the Hamirpur district, and its flowers are much used for food.

|| The Persian wheel (*rahat*) is in this district used only in the southern parganahs. *Baráhi* or *barháí* is the Bundelkhandí synonym for the *ikh* or *úkh* of other parts of the country.



Wearing on her leg heavy toothed\* and stocking-anklets she need-  
lessly bears a plaguily heavy load ;

The Lodhis, small and great, Sir, one and all, eat the fruit of their  
women's toil.

# XI.

Teli's (Oilman's) Song, No. 1.

तेलियो का गीत ।

तिलकी घानी परै तिलिनियाँ

झाट टूटगयो कोलू चटक गयो गिरगयो वाको बैल चिकनियाँ

खरी बिगड़ गई कधरा खदर गयो तेल बिगड़कर भयो तिलपनियाँ

धूमत९ चापड गिरगई साथ गिरैया वाको खसम मिलनियाँ

कहत कबीर सुनौ भारी साधव ऐसेही गिरजैहै सब दुनियाँ ॥ १ ॥

The Teli's wife was grinding the charge of oil seed ;

The upright beam broke, the mill cracked, her sleek bullock fell,

The oil cake spoiled, the residuum went bad, the oil spoiled and be-  
came watery ;

From going round and round she fell, and with her fell her worthy  
husband.

Quoth Kabir, 'Hear, good brother, just so the whole world shall fall.'

# XII.

Teli's (Oilman's) Song, No. 2.

सब जल नजि भज रामगुशार्द

नादिन भ्रमकोलूमे परकर पिरिहौ तिलघानी की नार्द

जैसे ब्रधम तैलकारनको तरसहि बाहर को मनमाही

ऐसेही माया मे फँसकर तुमजँ तरसिहौ मोरे सार्द

यथा तेल जल मेल जगत मे ऐसहि तुमजँ मिलज सबपाही ॥ १ ॥

All deceit abandon, worship Rám the Lord ;

Otherwise, dropping into the oil mill of error, you will fall down as  
does the charge of oil seed,

Just as the oilman's bullock longs to go out [but cannot],

Even so will you long, O husband mine, when entangled in vanity.

As oil† and water mingle in the world, just so should you mingle with  
all men.

\* The pewter and brass ornaments worn by the low caste women in Bundel-  
khand are very heavy and rattle like fetters : the *chullá* fits the leg like a stocking.

† i. e. as oil lies on water without mingling, so should you be in the world, but  
not of it.



*List of Rare Muhammadan Coins.—No. II. (Coins of the Kings of Dihli, Málwah, Bengal, Kulbarga, and Kashmír.—By J. G. DELMERICK, Dihli.*

(With two plates.)

DIHLI.

**Khusrau Sha'h.**

Plate V, No. 1. New variety. Silver and copper. Weight, 51 grs. A. H. 720.

|                                       |  |                                         |
|---------------------------------------|--|-----------------------------------------|
| ابو المظفر<br>خسرو شاه<br>السلطان ۷۲۰ |  | السلطان<br>الاعظم ناصر الدنيا<br>والدين |
|---------------------------------------|--|-----------------------------------------|

**Muhammad bin Tughluq Sha'h.**

Plate V, No. 2. Silver. Weight, 170 grs. A. H. 732.

|                           |  |                                  |
|---------------------------|--|----------------------------------|
| في عهد<br>محمد بن<br>تغلق |  | والله<br>الغني و انتم<br>الفقراء |
|---------------------------|--|----------------------------------|

*Margin—* بخضرة دهلي سنة اثنين وثلثين و سبعمائة

**Fi'ru'z Sha'h.**

Plate V, No. 3. Gold. Weight, 169 grs. A. H. 766.

|                                                              |  |                                                                                       |
|--------------------------------------------------------------|--|---------------------------------------------------------------------------------------|
| في زمن الامام<br>امير المؤمنين<br>ابي عبد الله<br>خلد خلافته |  | السلطان الاعظم<br>سيف امير المؤمنين<br>ابو المظفر فيروز شاه<br>السلطاني خلد<br>مملكته |
|--------------------------------------------------------------|--|---------------------------------------------------------------------------------------|

*Margin—* ضرب هذا بخضرة دهلي سنة ست وستين و سبعمائة

**Muhammad bin Fi'ru'z Sha'h.**

Plate V, No. 4. Gold. Weight, 170 grs. A. H. 793.

|                                                      |  |                                                               |
|------------------------------------------------------|--|---------------------------------------------------------------|
| في زمن الامام<br>امير المؤمنين<br>خلدت خلافته<br>۷۹۳ |  | السلطان الاعظم<br>محمد شاه فيروز شاه<br>سلطاني خلدت<br>مملكته |
|------------------------------------------------------|--|---------------------------------------------------------------|



**Ibra'hî'm Sha'h Su'r.**

Plate V, No. 5. Copper. Weight, 292 grs. A. H. 962.

|               |               |
|---------------|---------------|
| السلطان       | في عهد        |
| ابو المظفر    | الامير الحامى |
| ابراهيم شاه   | لدين الديان   |
| خلد الله ملكه | ٩٦٢           |

**Akbar Sha'h.**

Plate V, No. 6. Gold. Weight, 166 grs. *Julús* 5.

|                                      |                                   |
|--------------------------------------|-----------------------------------|
| تا زمين و آسمان را مهر انور زيور است | مهر مهر شاه اكبر آبروي اين زر است |
| خورداد الهى ه                        | ضرب آگره                          |

Plate V, No. 7. Gold. Weight, 164 grs. *Julús* 5.

|                           |                              |
|---------------------------|------------------------------|
| بران زرفام شه نور علي نور | زراست از مهر اكبر بادشاه نور |
| ضرب آگره                  | ه                            |

Plate V, No. 8. Gold. *Mihrábí*. Weight, 167 grs. A. H. 981.

|         |           |
|---------|-----------|
| يا معين | الله اكبر |
| ٩٨١     |           |

**Jaha'ngi'r.**

Plate V, No. 9. Gold. Weight, 200 grs. A. H. 1015.

|                                       |                                     |
|---------------------------------------|-------------------------------------|
| شاه نور الدين جهانگير ابن اكبر بادشاه | روى زرا ساخت نوراني ب رنگ مهر و ماه |
| ١                                     | ضرب لاهور ١٠١٥                      |

In the *Tuzuk-Jahángirí* (Sayyid Ahmad Khán's edition, page 5), *Jahángir* states that the couplet on this coin was the composition of the *Amír-ul-Umará*, or Muhammad Sharíf.

Plate V, No. 10. Gold. Weight, 165 grs. A. H. 1018.

|                                       |                                   |
|---------------------------------------|-----------------------------------|
| شاه نور الدين جهانگير ابن اكبر بادشاه | سكه زد در شهر آگره خسرو گيتي پناه |
| ه                                     | ١٠١٨                              |

Plate VI, No. 11. Silver. Weight, 220 grs. A. H. 1017.

|                            |                                 |
|----------------------------|---------------------------------|
| بنام شاه جهانگير سكه لاهور | بدهر باد روان تا فلک بود در دور |
| ١٠١٧                       | ١٤                              |

Plate VI, No. 12. Silver. Weight, 219 grs. A. H. 1019.



|                                                        |                                           |
|--------------------------------------------------------|-------------------------------------------|
| در اسفندارمز این سکه در<br>لاهور زد بر زر              | شهنشاه اسم شاه جهانگیر این<br>شاه اکبر    |
| ۵                                                      | ۱۰۱۹                                      |
| Plate VI, No. 13. Silver. Weight, 176 grs. A. H. 1035. |                                           |
| یافت در آگره روی زر زیور                               | از جهانگیر شاه شاه اکبر                   |
| ۱۰۳۵                                                   | ۲۱                                        |
| Plate VI, No. 14. Gold. Weight, 164 grs. A. H. 1025.   |                                           |
| شاه نورالدین جهانگیر این<br>اکبر بادشاه                | زد بر زر این سکه در اجمیر شاه<br>دین پناه |
| ۱۱                                                     | ۱۰۲۵                                      |

#### Shah Jaha'n II.

Plate VI, No. 15. Gold. Weight, 169 grs. A. H. 1173.

|                                          |                                |
|------------------------------------------|--------------------------------|
| ضرب جلوس میمنت مانوس<br>احمدنگر فرخ آباد | سکه مبارک شاه جهان بادشاه غازی |
| سنه احد                                  | ۱۱۷۳                           |

He was the grandson of Kám Bakhsh, the youngest son of Aurangzib, and was called Muhiyy-ul-Millat.\* He was placed upon the throne by Ghází-ud-dín 'Imád-ul-Mulk after the assassination of 'Álamgír Sání on the 8th Rabí'-us-Sání, A. H. 1173. Muzaffarí has it that he reigned until the 9th Safar, A. H. 1174, when the Bháo before quitting the capital to engage with the Abdáli, deposed him and appointed Prince Jawán Bakht, the son of Sháh 'Álam, in his place. This statement appears to be correct; for I also possess a silver coin of Sháh Jahán II., struck in A. H. 1174. Thus he reigned for a whole year and a month. His ultimate fate is unknown.

#### Beda'r Bakht.

Plate VI, No. 16. Gold. Weight, 169 grs: A. H. 1202.

|                             |                           |
|-----------------------------|---------------------------|
| ضرب دارالخلافه شاهجهان آباد | بزر سکه زد والي تاج و تخت |
| سنه احد جلوس میمنت مانوس    | محمد جهان شاه بیدار بخت   |
|                             | ۱۲۰۲                      |

\* Beale in his *Miftáh-ut-Tawárikh*, page 342, says his name was Muhiyy-us-Sunnat. On the other hand, Sayyid Ahmad in his *Asár-uç-Qanádíd*, page 42, states that he was the son of Muhiyy-us-Sunnat, the son of Kám Bakhsh. Sayyid Ahmad is right. *Vide* also Proceedings, A. S. B., for July, 1876.



I am aware of only two other specimens of the coins of Bedár Sháh, but they are both rupees, and therefore I believe my coin is unique in gold.

One of the silver coins is in the collection of Mr. Mark Thornhill, late B. C. S., and has been described in the list of that gentleman's coins by Nawáb Muhammad 'Abd-ul 'Azíz Khán, a Pleader of the Judge's Court at Farrukhábád, in a publication of the Bareilí Literary Society in 1867.

The other is, I believe, in the cabinet of the late Col. Guthrie. A rubbing of it was sent by Col. F. W. Stubbs to the Asiatic Society of Bengal and noticed in their proceedings for May 1871; and a promise was made at the time that a drawing of it would be published, but I understand that as the coin itself was never sent to Calcutta, no drawing was ever made or published.

In addition to Mr. Blochmann's remarks regarding Bedár Bakht in the Proceedings for May 1871, which are very interesting, I may add that Bedár Sháh nominally occupied the throne for only two and a half months. He soon disgusted his patron Ghulám Kádir Khán by his puerilities, such as flying kites (patang-bázi) in the public streets, &c., and after the flight, capture, and execution of Ghulám Kádir Khán by the Marhāṭas, Bedár Sháh was for a short time kept in confinement in Salimgarh, but afterwards suffered a cruel death. His body was thrown into a hole near the Náo Mahall, a building which formerly existed in the vicinity of the Dihlí gate of the Fort.

The *Tárikh-i-Muzaffarí* contains a good narrative of the events which resulted in the elevation of Bedár Sháh. Mr. Seton-Karr's *Selections from the Calcutta Gazettes for 1774 to 1788* are interspersed with several notices of Bedár Sháh and of the revolution at Dihlí. See also Captain Francklin's "*Life of Sháh 'Alam*", pages 181 to 195; but by far the best and most comprehensive account of the transactions is to be found in "*Keene's Mughal Empire*", Book II, Chap. VI, pages 169 to 189.

#### Baha'dur Sha'h.

Plate VI, No. 17. Silver. Weight, 171 grs. A. H. 1257.

|                                                           |                                                               |
|-----------------------------------------------------------|---------------------------------------------------------------|
| ضرب جلوس ميمنه مانوس<br>دار الخلافه شاهجهان اباد<br>سنه ٥ | ابوالمظفر سراج الدين محمد<br>بهادر شاه<br>بادشاه غازي<br>١٢٥٧ |
|-----------------------------------------------------------|---------------------------------------------------------------|

The last of the Mughuls, who was sentenced to banishment for life for complicity in the Mutiny of 1857. He died at Rangoon on 7th Nov. 1862. His coins are rare. Lord Ellenborough stopped the issue of money in the name of this Titular in the cold season of 1842-43. Before that on the



occasion of certain "Jashans" or festivals, such as the "Nauroz" and the anniversary of his coronation, &c., coins used to be specially struck in his name and offered as a part of the customary *nazar* by the Resident on behalf of the British Government. See also Kaye's Sepoy War, Vol. II, page 12 and Appendix.

# MÁLWAH.

## Hu'shang Sha'h Ghorí.

Plate VI, No. 18. Gold. Weight, 170 grs. No date.

|            |               |
|------------|---------------|
| ابوالمجاهد | السلطان       |
| هوشنگ شاه  | الاعظم حسام   |
| السلطان    | الدنيا والدين |

*Margin.*—Cut away.

## Mahmu'd Sha'h Khilji.

Plate VI, No. 19. Gold. Weight, 169 grs. A. H. 870.

|                   |                          |
|-------------------|--------------------------|
| سكندر الثاني      | السلطان الاعظم           |
| يمين الخلافة ناصر | علا الدنيا والدين        |
| امير المؤمنين     | ابوالمظفر محمود شاه خلجي |
|                   | خلد الله خلافته          |

*Margin.*—ضرب هذه السكة بحضرة شادي اباد سنة سبعين وثمان مائة.

# BENGAL.

## Baha'dur Sha'h.

Plate VI, No. 20. Gold. Weight, 165 grs. A.H. 728.

|                 |                              |
|-----------------|------------------------------|
| ضرب ناصر الواثق | السلطان المعظم               |
| بالله محمد بن   | غياث الدنيا والدين ابوالمظفر |
| تغلق شاه        | بهادر شاه السلطان            |
|                 | ابن السلطان                  |

*Margin.*—هذه السكة بحضرة سزارگانو سنة ثمان وعشرين وسبعماية.

For a single silver specimen, lost in the Mutiny and no longer in existence, see coin No. 186, page 215 of Thomas' Chronicles of the Pathan Kings of Delhi.

## Husain Sha'h.

Plate VI, No. 21. Gold. Weight, 162 grs. A.H. 905.

|                     |                   |
|---------------------|-------------------|
| سلطان حسين شاه      | السلطان           |
| بن سيد اشرف الحسيني | العاقل علا الدنيا |
| خلدت ملكه ٩٠٥       | والدين ابوالمظفر  |



Another gold coin, dated A. H. 907, has been figured and described by Mr. Blochmann in the Journal of the Asiatic Society of Bengal, Part I, No. 3, for 1874.

### BAHMANÍ.

#### Ahmad Sha'h.

Plate VI, No. 22. Gold. Weight, 166 grs. A. H. 853.

|                  |                   |
|------------------|-------------------|
| ابوالمظفر علا    | السلطان           |
| الدنيا والدين    | مويد الاسلام      |
| احمد شاه بن احمد | جامع الفضل والعدل |
| شاه السلطان ٨٥٣  | والاحسان          |

#### Mahmu'd Sha'h.

Plate VI, No. 23. Gold. Weight, 170 grs. No date.

|                       |                  |
|-----------------------|------------------|
| ابوالمغازي            | المتوكل علي      |
| محمود شاه بن محمد شاه | الله القوي الغني |
| الولي البهمني         | السلطان الاعظم   |

*Margin.*—Cut away.

### KASHMÍR.

#### Muhammad 'Ali' Sha'h.

Plate VI, No. 24. Silver. Weight, 96 grs. A. H. 986.

|           |                            |
|-----------|----------------------------|
| ضرب كشمير | ظاهر الدين محمد علي بادشاه |
| ٩٨٦       | ٩٨٦                        |

*Margin.*—نہصد و ہشتاد و شش

#### Muhammad Yu'suf Sha'h.

Plate VI, No. 25. Silver. Weight, 94 grs. A. H. 987.

|           |                             |
|-----------|-----------------------------|
| ضرب كشمير | منير الدين محمد يوسف بادشاه |
| ٩٨٧       | غازي                        |

*Margin.*—نہصد و ہشتاد و ہفت

Firishtah says that 'Alí Sháh was killed by a fall from his horse in A. H. 986, and was succeeded by his son Yúsuf. *Vide* also *Aín Translation*, I, p. 478.



*The Bhars of Audh and Banáras.—By PATRICK CARNEGIE, Commissioner of Rái Bareli, Audh.*

Who are the Bhars ?

This is a question that has very often been asked since the British became possessed of the Province of Banáras, and more especially since they annexed Audh. Probably no one has devoted more thought to the solution of this question, or has had greater opportunities of considering it closely than the writer, and he therefore proceeds to answer it by the light of his own enquiries.

There is unquestionable evidence that Ayodhyá, near Faizábád, was the capital of the solar race of Chhatris, many centuries before the Christian era. That this race was Aryan and Sanskrit-speaking does not admit of doubt. The writer is in possession of numerous Bactrian coins, bearing Greek and Sanskrit inscriptions, of the Kadphisis and Kanerko groups, portions of two large hoards of many hundreds each, which were discovered in Ayodhyá and near Sultánpúr. Not a single coin was found in either of these hoards of any subsequent mintage, which is proof positive that these coins had remained hidden where they were eventually found in old metal vessels, since they formed part of the currency of the day. Time, the 1st and 2nd centuries, B. C. We may from this with perfect confidence assume that the Sanskrit-speaking races were dominant in Ayodhyá and Audh from before the days of Rámchandra and the Rámáyan, down to after the commencement of our Era.

Our path is next illuminated by another historical glimpse. In the 4th and 6th centuries the Chinese pilgrims Fa-hian and Hiouen-Tsang visited Hindústán, when Buddhism was still dominant throughout the land, with its chief centre at Sahet-Mahet, on the Gonda-Bahráich border, the Rome or Jerusalem of that creed. At Ayodhyá, at Banáras, at Kanauj, at Kashmír, and at all the other chief centres of ancient fame, Buddhism was found to be paramount ; at the same time, however, inimical as the two religions may have been to each other, temples dedicated to Brahma were also found by the pilgrims at all the places named.

To Numismatics we owe our next clue. Within the writer's observation four sets of debased gold or silver coins of the second Kanauj series, have been found in the Faizábád, Bahráich, and Partábgarh Districts, of which he has various specimens, and amongst these not a single coin of a more modern date was discovered. Moreover, in the Asiatic Society's Journal for January 1841, page 98, we have copy of a land grant of Jayachandra found near Faizábád, and sent by the Resident, Colonel Caulfield, to James



Prinsep. Here then we have proof absolute that Kanauj was the territorial capital of north-east Audh 6 to 900 years ago.

About that time, too, we arrive in the more immediate region of direct history, with the Muhammadan advent and conquest, A. D. 1000—1200. It is denied by no one that on the arrival of these invaders they found in possession, and soon overthrew, the Tomárs of Dihli, the Ráthors of Kanauj, and the *Bhars*, who were found to be in universal possession of the soil of north-east Audh and Banáras. And it is with the last two of these classes that we have any present concern.

Literature and science have brought us so far, and up to this point speculation and theory have been alike avoided; we must now fall back on tradition, and see what that may bring forth. The late Maharájá Sir Mán Singh, K. C. S. I., himself a Brahman amongst Brahmans, was a scholar and a savant as well as a politician and a soldier, and it was the privilege of the writer to know him intimately and to receive much valuable information from him connected with Audh and its peoples. The writer has also had access to some of the most learned pandits of the day, including Umadat of Ayodhyá, and Súraj Náráin of Aldemau, a former pupil of the Banáras College, and the information received from such sources as these, so far as it relates to the subject in hand, he now proposes to utilize for the purposes of this paper.

Centuries of Brahmanism which the want of tact of its priesthood had made intolerable to the secular members of the community, had given place to centuries of Buddhism, during which sway was at different times held over Ayodhyá, by dynasties which had Gayá (Magadh) and Sahet-Mahet (Siri-Bastu) as their respective capitals. But the ardour of perverts does not last for ever, and so for yet another term of centuries, came a period during which the people troubled themselves but little about religion and caste; the Hindu Pantheon was forgotten and forsaken, and but little attention was paid to even the well known gods in whose hands alone rested the powers of creation and destruction.

The writer has repeatedly been assured by Sir Mán Singh, and Pandit Umadat, that during the present century an inscription was discovered in the mound known as the *Maniparbat* in Ayodhyá, which attributed its construction to Rájá Nanda Bardhan of Magadh, who is generally accredited with the suppression of Brahmanism there, and with the establishment of the non-caste system which then became general. This inscription was seen and read by both of these gentlemen, and was sent into Lakhnau in Náçir-ud-dín Haidar's time, but all attempts to trace it further have proved abortive. After this third period, the period of atheism, gleams of Brahmanical light again began to appear in Ayodhyá many centuries ago, and with this circumstance is traditionally associated the name of Vikramáditya



of Ujjain. Its position on the Sarjú, and the survival through many vicissitudes of the shrine of Nagesar Náth Mahádeo led to its identification. But it was probably long after this, and perhaps some ten centuries ago, that the great Brahmanical revival, which had Ajmír for its centre, commenced, and which in time reached eastwards even to Ayodhyá.

It was, as we have been informed, when the power of the Gayá dynasty waned, that Ayodhyá became the apple of discord between the rulers of Kanauj and Sahet-Mahet, and then it was that Chandádeo Ráthor (regenerated Buddhist) and Sirí Chandar (Buddhist and Ex-Súrajbang Chhatrí) referred their pretensions thereto to the issue of the sword, when a great battle was fought at the modern Satrik, which ended in the downfall of the latter, (the former vanquisher of Sayyid Sálár) and the overthrow of his creed and capital. Time, the early half of the eleventh century. Thus came it to pass that those whom the Chinese pilgrims had found to be Buddhists in Dihlí, in Ajmír, and in Kanauj, in the 4th and 6th centuries of our era, were found by the Muhammadans six hundred years later, restored nominally at any rate to the Vedic faith of their fathers. The Buddhists were believed to be disregards of caste distinctions, but this was not universal, and for a time at any rate the perverts from Brahmanism to Buddhism maintained their caste distinctions; because the Chinese pilgrims refer to Kusala, "with its Kshatriya king of the Buddhist faith"; another king is mentioned as a Kshatriya "and a zealous Buddhist"; and of a third it is said that though a Brahman he patronizes the Buddhist religion. Lastly, the pilgrims were "particularly struck with the minute observances of caste". It would thus appear that in the 4th and 6th centuries caste distinctions were not entirely disregarded by the perverts; they were indeed in some instances maintained till the Brahmanical revival; for it is believed that the rulers of Dihlí continued to call themselves Tomárs and Ráthors both before and after that event.

But whether it was during the Buddhist supremacy or at a later time when religion and its accessories became greatly neglected, there can be no doubt that for a considerable period before the Muhammadan conquest the distinctions of caste had altogether disappeared, and the soil of north-east Audh and Banáras had become possessed by a single god-neglecting, caste-disregarding race, whom it is the fashion amongst the natives of the day, who are mostly their descendants, to treat with the utmost disdain.

Here I answer the question put at the beginning of this paper, this god-neglecting caste-disregarding race were the Bhars!

There is nothing either astonishing or improbable in this, for we have the authority of the great lawgiver Manu that "all those tribes of men, who sprang from the mouth, the arm, the thigh, and the foot of Brahma, but who became outcastes by having neglected their duties, are called Dásyus,



or plunderers, whether they speak the language of Mleechhas or that of Aryas." *Dásyu* is a common word used in old Hindu writings to indicate such outcastes as the Bhars, Bhils, Chiro, Gonds, and Kols, most of whom, strange to say, still keep up a Rájput tribal nomenclature, and most of whom are gradually becoming again uplifted and enlisted into the fraternity of Rájputs. Family vicissitudes are thus treated by Manu:—"Should the tribe springing from a Brahman by a Sudra mother, produce a succession of children by the marriages of its women with other Brahmans, the low tribe shall be raised to the highest in the seventh generation. As the son of a Sudra may thus attain the rank of a Brahman, and as the son of a Brahman may sink to a level with the Sudra, even so must it be with him who springs from a Kshatriya; even so with him who was born a Vaisya."

These quotations from the famous Code of Hindu Ethics surely make it very clear that there was a general Brahmanical fall, when distinctions of language even did not prevent the people from becoming a universal family of *Dásyus* or outcastes, a family known in the area of which we treat as *Bhars*; and they also explain how in the general Brahmanical revival that finally followed, these robbers and plunderers were admitted once more to all the privileges and beatitudes of the twice-born.

Many years of the official life of the writer have been devoted to duties which involved the examination of the genealogies of some of our oldest and best native families, and the results of his enquiries have led him to the following conclusions: (1) That not a single member of the landed gentry or local priesthood can trace back to an ancestor who held an acre of land, or who administered a spiritual function, within the area under enquiry during the Bhar supremacy; (2) That scarcely any of them can trace back to an ancestor who came into Audh at the Muhammadan advent, when the Bhars, who were then in universal possession of the land, were overthrown; and (3) That the great mass of the landowners of to-day can trace no further back than to an ancestor whose origin is easily discovered to be both indigenous and spurious.

Referring to the *first* of these three classes, it amounts unquestionably to this; that in what was once the very heart and soul of Hindústán, the much vaunted birthplace of the solar race and of Hinduism, there was not a single Hindu landowner left in it, and it had become overrun by pagans, when the Muhammadans conquered it; but no sooner had that event taken place, than not a pagan was to be seen anywhere; they had utterly disappeared, and the country at once became peopled again with orthodox Hindus, with their veds and their pandits, just as if they had never left it.

In regard to the *second* of these classes, the writer thinks it expedient here to quote some remarks from a treatise by him on the 'Races of Audh':—



"I have found the opinion so generally entertained that there was a Rájput conquest and colonization of Audh, that it requires a distinct answer. The theory which I have broached and supported in this paper (of the Bhars of old being the Hindus of to-day), is invariably met by the argument that it opposes the declarations of a clear and general tradition. It is argued that in spite of specious theories to the contrary, such a tradition cannot in its main features be false; that if to satisfy the pride or envy of the more recent converts, an origin was invented for them, it would have been more consistent with the gradual growth of the Brahmanical creed, to assert a continuous adherence to it, than immigration by force of arms: that if the Rájput clans retained the shameful tradition of illegitimate alliances with low caste women, the fact affords strong grounds for crediting the remainder of their traditionary history.

"To this argument there is but one reply. I have not discovered the existence of any such central tradition of conquest by Rájputs from without, as that on which the argument entirely rests. It is stated in some of the books to which we commonly refer, but it is not the statement of the Rájput clans of Audh. I can refer to the histories of many Rájput clans. We find accounts of their origin, some mythical, some confused, and some not very honorable; but none of them declare, as do many of the Muhammadan legends, the arrival of an army of clansmen, and colonization by the victors with their families and kin.

"The very fact of the singular connections to which so many of the clans trace their descent, is opposed to the idea of a conquest by arms. An orthodox Hindu, the conqueror of a low-born race, would not have founded a family by an alliance which his religion sternly rebuked. He would, like his Muhammadan contemporaries, have summoned his wife and children to the new country which his prowess had won. The tradition of descent from a pure Chhatrí may point to what is possibly true, that some pure Chhatris did immigrate into Audh as Buddhism waned, of which the province was the cradle and head quarters, and there is evidence to shew that Buddhism retreated from the west and south to the north through Audh. That the western Chhatris were, therefore, earlier returners to the Brahman creed than the inhabitants of north-east Audh, and sent representatives to this province before the final decay of Buddhism and the Bhars, is not surprising. It is finally noticeable that the Audh clans who claim an extra-provincial origin, trace their descent to single Chhatris, and not to troops of Rájput invaders. Such are the Bais of Baiswára, who claim to descend from Tilokchand, who came from the Central Provinces, and the Rájkumárs, from Barriar Singh, a Chauhan of Manipuri, through whom they claim kindred with Prithiráj of Dihli. With these two exceptions none of the clansmen of eastern Audh claim a western origin."



In regard to the *third* class, it is always invidious to enter into details of *pedigrees*, but a few amongst very many available instances may be given. The Kanpúriá is one of our most important clans; so is the Bandelgot. In twenty generations according to the members, both these pedigrees are lost in obscurity; but what the world says is this, that they are the offspring of mal-alliances between two Brahman brothers, and women of the Ahir and Dhárkar castes. The Amethia is not an unimportant clan. They call themselves Chamár-gor Rájpúts, and their generations are not longer than the others named. What the world says of this, is that a Chamár-gor is the offspring of a Chamár father and a Gor-Brahman woman. Moreover within the memory of man, an Amethiá Chief has, according to Sleeman, taken to wife the grand-daughter of an ex-Pási Chowkidar, and raised up orthodox seed unto himself. The Raotars are another numerous clan with but half the number of generations, and with precisely a similar parentage as the Kanpúriás (Brahman-Ahir). Their name is taken from Rawat, an Ahir Chief. The Pulwars are influential and numerous, and of these it is said that they are descended from a common ancestor, who had four wives, of whom one only was of his own status, the others being a *Bharin*, an Ahirin and another low caste woman. Here we have a Hindu-Bhar origin freely admitted. The Bhalesaltan clan, also, is comparatively modern, and of equivocal Ahir origin. There are numerous families of Bais, too, who are in no way related to the Tilokchandí Bais of Baiswára. The former are modern and equivocal, the term Bais being, it may be mentioned, the most ready gate by which enlistment into the fraternity of Rájpúts could formerly be achieved. The most proud and haughty of our clansmen have not been slow to take to themselves wives from the mammon of unrighteousness, in the shape of the daughters of those whom we have shewn above to be of equivocal origin, and so in the result, their offspring, our contemporaries, are little better than their neighbours. Add to this the fact that owing to daughters being as a general rule put to death as soon as they were born, wives had almost invariably to be purchased, through those who were as great adepts at cheating in respect of caste, as horse-dealers are elsewhere, in passing off screws, and it will be admitted that it really does not very much signify who the fathers of Audh were, for if its mothers were not Ahirs and Bhars, there is no certainty that they were at all better than if they had been members of those classes. Finally, all those land-owning families who can only urge an indigenous origin, must, whether they admit it or not, recognize the fact that they are descendants of Bhars, for every acre of land was owned, and the country was throughout peopled, by these alone, and by no others.

The next point to which we shall refer is *language*. Notwithstanding the evidence we have that Audh was peopled by the solar race of Hindus



before our era, it has been said that the Bhars who peopled and held the soil and who are as modern as the Muhammadans, were aborigines. If so, they must have had a language. But they had not. Documents of older date have been found, but no Bhar writing was ever heard of ; and we have it on the authority of an Ouseley, an honoured name in oriental lore, that the Bhars were of Sanskrit-speaking origin, otherwise that they were Aryans, otherwise that they were demoralized Hindus. The parganas of Bhardoi, Bharosá, Bahráich, and Bharolí, and the town of Bhartipur (near the Bhar capital, Kusbhawanpur *alias* Sultánpúr,) are all believed to derive their names from the Bhars ; in modern times they have assumed the pronunciation of Badoi, Barrosá, Baráich, and (Rái) Barelí. Sleeman also mentions a large district of nearly a thousand villages near Mahamdí, which even in his day was known as *Bharwára*, now occupied by Ahban Rájpúts.

On the point of *religion* we have no reason for supposing that the Bhars were by any means devout, still they were no doubt superstitious, and in some sort of way they revered and made sacrifices and offerings to the powers of creation and destruction. In Baiswára the universal belief is, that the Bhars of the past are the Ahírs of our day. That of course amounts to an admission that they were Hindus. It also accounts for an Ahír origin being given to so many of our Rájpút clans, as already pointed out. Sir Henry Elliot, too, traced an affinity between Bhars and Ahírs. Mr. Bennett, in his history of the Rái Barelí clans, mentions that "the tomb of the Bhar chieftains (Dal and Bal, slain by the Muhammadans,) is still at Pakraulí, rather more than a mile from Dalmau, and is celebrated by a fair in the autumn, at which great numbers of Ahírs collect, and offer milk to the souls of the departed heroes." The writer has seen this shrine which contains idols, supposed to be the headless bodies of the deceased chiefs who were decapitated and turned into stone, but which are only hideous representations of the goddess of destruction. These idols are worshipped not only by Ahírs (whom, according to Sir George Campbell, other Hindus include amongst the respectable classes, because they are in charge of the sacred cow), but by all other Hindus as well, including even Brahmans. Had the Bhar chiefs whom these idols are said to represent, been pagans, or other than Hindus, it is scarcely to be supposed that their tomb would have remained to this time the object of Brahmanical adoration.

Since the writer first addressed himself to the consideration of subjects akin to the present, his views and opinions in regard to the working upwards in the religio-social scale of the different sects of Hindus, have received most unexpected and remarkable confirmation from the very able writings of Mr. Alfred Lyall, B. C. S., on Hinduism as a missionary religion, &c. He has already instanced cases of the movement upwards by marriage. He can at this moment lay his hand on families of Brahmans who were made



Brahmans to meet the momentary and temporal necessities of a man of influence. So also he can name families who are now Rájputís (if not Chhatrís), because it had been their good fortune to render service as menials to a man who had the power to reward it. These are comparatively modern instances of the movement upwards. Moreover, the Mahants of the far-famed Monkey-temple of Ayodhyá, revered of all good Hindus, are recruited from all classes of Hindus, even to the lowest, and having gone through their discipleship, they receive reverence and homage from the highest in the land. It can scarcely, therefore, with truth be contended that Hinduism is not a missionary religion, or that social advancement is fettered by caste prejudice.

It must always be kept in mind that the change from Brahmanism to Buddhism did not involve an absolute change of religion, it was a universal protest against priestly intolerance—just as Protestants rose against Roman Catholics, or the Free Kirk of Scotland rebelled against State interference, and in process of time, when the cause that brought the schism about, had been forgotten, the heretics again quietly lapsed into the old faith, apparently as a matter of course, just as we hear it said that the tendency of the day is for the Free Kirk to return to the Establishment. Had there been an absolute change of religion, it might have been very different. At the same time we have before our eyes an instance to show how difficult it is for natives to change, and it strongly supports our position that throughout the Buddhist and Atheist periods the traditions of caste were not altogether lost. We know that 400 years ago the Muhammadan dynasty of Jaunpúr made converts to their faith in no measured degree, the practical result being that nearly every one of our older Rájput clans has its Muhammadan or Khánzáda branch; but such is the tenacity of consanguinity and custom, that while on the one hand, the perverts retain all their old Hindu ordinances and rituals, and are allowed to join in all the domestic ceremonials of the Hindu portion of their clans, by the names of which, moreover, they still continue to be known, the old Muhammadans on the other hand, who profess to disregard caste, will not readily marry with the perverts, and hesitate not to show them the cold shoulder on every possible occasion. Here we have an absolute change of religion, notwithstanding which all caste forms and distinctions have been scrupulously maintained for more than 400 years. Does this not support the position that in the other instance, in which there was first a mere modification and afterwards a temporary neglect, but no absolute relinquishment of creed, the old traditions were burnished up and the old rituals and forms once more revived with the return of god-fearing, caste-respecting days. To shew that the breach between a Brahman and a Buddhist is not so very wide as we are taught to suppose, it may be mentioned that at this moment all the Jain-Buddhist temples at Ayodhyá are in charge of a Gor Brahman!



One of the things about the Bhars which create surprise, is that the numerous old mounds on which we still find traces of their habitations, and which are known throughout the country as *Bharádís* (or *Bhar-ábádís*), are usually found strewn with burnt bricks and other débris, indicative of a better class of residences than are adopted by the agricultural population of these days. The reasons for this, however, are not difficult to assign. There is nothing more certain in political economy than that the land can only in comfort support a certain number of lives ; and one of the difficulties of the future, is what we are to do with our surplus population. Eastern Audh is at this moment the most densely peopled tract in the world, and day by day as population increases and the margin of culturable waste becomes smaller, the means of the people, derived so largely from agriculture, will become individually smaller. In the days of the Bhars, population was sparse, and land plentiful, the people consequently were in better circumstances. Moreover, Audh was then covered with jungle. Even the eastern or most advanced portion of it, was known as Banaudha, the "Audh forest". Wild animals inhabited the woods. It followed that people who were comparatively well off, should secure themselves from beasts of prey, by using bricks and tiles in the construction of their houses, rather than the mud and reeds which poverty and security have now made universal.

There are few things more misleading and untrustworthy than the definitions which natives, however well educated, offer in explanation of the names of tribes and localities ; and every effort to find a reasonable rendering of the term *Bhar* has as yet failed. Tod mentions that in the times to which this paper refers, the people of Rájputáná became amalgamated into a single great family conglomeration, and they were called *Bhumiya*. This is a well known term indicative of connection with the soil, and means neither more nor less than *agriculturist*. This was precisely the position occupied by the Bhars in the territory peopled by them, and for all we know to the contrary, the name may have some similar meaning.

It is denied by no one that 500 years ago no one but the Bhars owned a single acre of land in these parts, but not a single inch of land has been owned by the Bhars since the Muhammadan conquest. In fact but few of the tribe are now to be found, and these few follow such degrading occupations as keeping swine, in the most eastern portion of Audh. Whether these are the same as the Bhar rulers of the past (whom Mr. Thomason refers to as the Ráj-Bhars of Rámá's time) or not, it is impossible to say, but they now worship the same gods as the Hindus, and by general admission they are Hindus. The Rájputs and the Rájbhars of old were not above caring for the good things of this life—and whatever the former may do now, they then eschewed neither pork nor strong drink. The Bhars of to-day are as liberal in their views on these things as their ancestors were, and the only oath they really respect is associated with wine.



Our able friend and fellow labourer in the field of Audh antiquarian research, Mr. W. C. Benett, B. C. S., the author of the history of the Rái Bareli clans, is one of those who believe in a Chhatrí colonization and conquest from the West, and is disposed to treat our views on the Bhars, as set forth in this paper, as somewhat heretical. But whereas that able enquirer gives no evidence at all of any military colonization, he records many things which support the views which he has not yet ceased to consider as erroneous. We quote some of these remarks here and reply to them. He says, p. 21: "The story of his (*i. e.*, the Great Bais Rájá, Tilokchand's) creation of new castes, is too well attested and too much opposed to the spirit of Hindu invention, to admit of doubt. More than one caste of Brahmans are grateful to him for their cord and their privileges, while it is indisputable that he largely increased the number of Kshatrí clans. The Ahir Bhale Sultans, the Kahar Mahrors and the Pargulis directly ascribe their elevation to him; and numerous castes in the Faizabad and Gonda districts, such as Gundharias, Naipurias, Barwars, and Chahus claim to have been originally Bais, ..... There are besides numerous families of small zamíndárs who call themselves *Bharudhi Bais*, and whose want of any tradition of immigration and peculiar religion, distinguish them from the pure Bais of the West." This last instance amounts to the admission of a Bhar descent, and in our estimation the difference in purity between the various Bais branches is hard to distinguish; some are no doubt older than others.

At page 25, Mr. Benett admits with us, that the Bais (other than the Tilokchand branch) "occupy nearly the lowest position among Audh Chhatrís", and he adds, "It seems most probable that about 400 years ago, members of the agricultural and military aristocracy of all castes assumed the title of Bais, in much the same way as the leading families of Orissa and parts of Central India are now claiming to be Chhatrís." It pleases those who think with Mr. Benett to speak of the inhabitants of those days as "the agricultural and military aristocracy of all castes"; to our mind, however, we have demonstrated that those classes were then represented by the caste-forgetting Bhars alone. It is not denied that these became Ráj-púts, though of "the lowest position". It is remarkable that the families of Orissa and Central India to which Mr. Benett refers, have all along retained a Chhatrí tribal nomenclature, and now that they are again become Chhatrís, they resume the old family titles! This surely supports the view of a general local religious downfall, followed by a gradual local reformation and revival!

Mr. Benett thus finally disposes of the Bhars (p. 25): "The complete extinction of this people has occasioned much surprise, but it is not difficult to understand. Both the Musalmáns and the Hindus were conquering nations, and the hand of each was turned against the old inhabitants whom



they wished to dispossess. Against one enemy the Bhars might have stood, and retained, even when defeated, a portion of their former rights, but in the wars between the invaders, each victory, to whichever side it inclined, was to them a new defeat and entailed another onslaught on their possessions. As the balance swayed from side to side in the long and doubtful struggle between the Rájputs and the eastern empire, they suffered with every change of fortune, and were conquered not once but many times. It was not one war of extermination, but the harassing attacks of two centuries, often repeated, each time with new vigour, before which they fell. Their customs, their position, and we may conjecture their language and nationality, prevented anything like a perfect union with either of their enemies. And yet there can be no doubt that while many were slain, and many fled to the north and to the east, many still survive in their old territory under modern names. The statesmanship of Tilokehand elevated not a few of their principal families to the rank of Chhatris, and the Tirgunait Brahmans, the Kharibind Kurmis, the *Bharotia* and Bhiettia Ahirs, and many families of the Gújars are connected with their race by hardly doubtful tradition. A careful enquiry into the private worship and peculiar customs of the present castes of the district would probably still further disprove the tale of their utter extinction, but it can hardly be a matter for surprise that the more obvious evidences of their kingdom have been swept away."

It will be observed that in this last quotation the whole argument is based on the Bhars being *an older people* than the Hindus, with *a language of their own*. Now nothing is more certain than that the Bhar non-conformists were not in power, or so far as we know in existence in the 6th century, when the Chinese pilgrims visited Audh, which was then peopled by Buddhists and Brahmanists; but they were dominant when they were conquered by the Muhammadans. So their day of power was obviously confined to a period between the 7th and 12th centuries. The Súrjbañs Hindus under Ráma, on the contrary, flourished centuries before the Christian era, and we are still in possession of writings to establish what their language was. Then what becomes of the argument based on the Bhars being older than the Hindus and having a language of which, however, not a vestige written or oral is to be traced!

Mr. Benett fully admits that "many (Bhars) still survive under modern names", and that many were "elevated" by what he calls "statesmanship", into the ranks of the twice-born. In the circumstances it appears that our views of a social and religious regeneration have been completely confirmed by these quotations, and it is alike needless to look further for proofs of an immigration or colonization from the west, or an extermination or exodus to the north and east.



We began this paper with a reference to the teachings of science and literature, and we shall end it in the same way. Books have told us of the sovereignty of the Súrajáns of old and the Ráthors of more recent times. The coins of Bactria and Kanauj have confirmed what these books have said of these races of rulers, and land-grants of the last mentioned dynasty have added to this confirmation. But neither book nor coin nor grant throws even the faintest ray of light on a people who possessed the land at a still more recent period ; and whose sway, over the territory inhabited by them, was for many centuries universal. The historians who might perhaps have been able to tell us the facts, are the Buddhists, or their successors the Jains, who have locally disappeared : from the Brahmans we are not likely to receive further information. It is not, however, impossible that enquiries carefully conducted at Mount Abú, at Parísnáth, and at Katmandú, may yet throw light upon a subject which is still involved in obscurity. The Ayodhyá of old has always been intimately connected with those localities. Some half dozen of the Jain Hierarchs (*tírtthankaras*), who afterwards died at the first two mentioned of those places, were natives of Audh, and it was from Abú that the Brahmanical revival gradually spread over the country which eventually reached even to Audh. The historians of those quarters may not have the same motives for secrecy that our Brahmans, who alone can have the information here, possess, and to them only can we therefore look satisfactorily to elucidate this mystery.

---

*Translations from the Díwán of ZÍB-UN-NISÁ BEGAM, poetically styled 'MAKHFI, daughter of the Emperor AURANGZÍB.—By P. WHALLEY, B.C.S., Murádábád.*

## No. I.

با گلشن غم ساز که باغی به ازین نیست  
 خون خور عوض می که ایامی به ازین نیست  
 پروانه تحمل کن و مهتاب نشین باش  
 در خانه مفلس که چراغ به ازین نیست  
 هنگامه کفم گرم من از نشئه صحبت  
 در مذهب احباب دماغی به ازین نیست  
 معشوق و می و گلشن و جمعیت خاطر  
 خوش باش که اسباب فراغی به ازین نیست



سوز جگر و شعله بفانوس بدن زد  
 بر سینه عاشق گل داغی به ازین نیست  
 مخفی نه نهد گام برای که بود کام  
 در راه طلب هیچ سرانگی به ازین نیست

*The Gate of Ecstasy.*

In the dusky alleys,  
 Where grief dreams and dallies,  
 Pause, O soul, nor seek the bowers of bliss !  
 Drink the wine of sorrow :  
 Whence shall lover borrow  
 Strong endurance better than from this ?  
 Moth, forbear thy yearning  
 For the lamp's bright burning !  
 See, the moonlight, from yon heaven's abyss  
 Sends her splendour welling  
 Through our roofless dwelling ;  
 See, O moth, there is no lamp like this !  
 In the tranced glammers  
 Of our mystic amours  
 Smile to smile and kiss replies to kiss.  
 In the love and laughter  
 Of the here or the hereafter  
 No enchantment shall be found like this.  
 Where my love reposes  
 'Twixt the wine and roses  
 Nothing, foolish heart, can chance amiss.  
 Rest thee here, for never  
 Through the long forever  
 Shall we meet with happiness like this.  
 In the heart's recesses,  
 Where the soul confesses,  
 Burns the flambeau of my love, my bliss :  
 Nor does breast of lover  
 In earth's confines cover  
 Any purer brighter flame than this.  
 Makhi, where temptation  
 Flaunts its invitation,  
 Pause not, question not, nor be remiss :  
 They who, onward slaving,  
 Follow their heart's craving,  
 Ask not, need not any guide but this.



## No. II.

باده نوشیدم ولی از کف جانانم مست  
 تشنه خاص دهد صحبت همخانم مست  
 همه افتادم مخمور خرابات شدید  
 برکن ای ساقی هشیار تو پیمانم مست  
 باغبان منت مهتاب مکش در شب تار  
 شمع گلزار بود نرگس مستانم مست  
 پیش اصحاب خرد تا بکی از به خردی  
 نقل مجلس کنی ای مست تو افسانم مست  
 از ملاحات نمک بر دل افکار زدم  
 بستم شور بود لازم بیگانم مست  
 مخفی از فیض جذون شیوه هشیار گرفت  
 با خرد یار کند صحبت دیوانم مست

*The Dervish's Revel.*

— ۰ — | — ۰ ۰ — | — ۰ ۰ — | — ۰ ۰ — ||

Wine we drink. Take not the cup but from the hand frenzied with wine.  
 Brothers all, gather ye close. Sympathy breeds fury divine.

Here beside table and door, tumbled about, strew we the floor.  
 Fill the glass, soberer host, drench us again drunk to the core.

Gard'ner mine ! tease not the coy moon with thy prayers, dark tho' the night,  
 Light enough,—as from a lamp, gleams from the eye drunkenly bright.

Here before lords of the brain, why and till when, foolishly vain,  
 Sett'st thou forth, crown of the feast, drunkard, thy soft ebriate strain ?

Laughing thro' tears sprinkle we aye salt on the soul bleeding and bare,  
 Salted cakes are for the strayed, wandering, and lost, wholesomest fare.

We amid wassail and wine chronicle truths, holy and sad :  
 Let us be,—wisely we seek friends among rakes, drunken and mad.

*Note.*—See Brown's *Dervishes*, p. 224. "Their exercises consist, like those of the Ruffees and other Orders, at first in seating themselves, and afterwards in rising



upright ; but in often changing the attitude, and in redoubling their agitation, even until they become overcome with fatigue, when they fall upon the floor motionless and without knowledge. Then the Shekh aided by his vicars employs no other means to draw them out of their state of unconsciousness than to rub their arms and legs and to breathe into their ears the words *la ilaha ill' allah.*"

## No. III.

رو بوادي چون نهادم عشق پاکم بهترست  
 ناله‌ای زار و آه دردناکم بهترست  
 دل که در راه محبت پیشه مجنون گرفت  
 دیده پر اشک ز دامت سینه چاکم بهترست  
 غم قوي محنت فزون و دل بغایت ناتوان  
 ای اجل زین زندگانی بس هلاکم بهترست  
 منکه بیمار شرابم بر لبم شربت چه سود  
 جای شربت بر لب من آب تاکم بهترست  
 دشته ام چون از امید خودش مخفی منقعل  
 با هزاران حسرت اندر زیر خاکم بهترست

*The Mystic's Choice.*

Mine be pure love, love that pursues its hest  
 Through wild and desert ! mine the lone lament,  
 The heart of Majnún, and his weary guest,  
 And tears, and raiment rent !

Mine be the toil that overtaks the breath,  
 The groan of pain, the agony of strife,  
 The life that only lives to long for death,  
 And death more dear than life !

Mine be the wine of love, the deadly wine  
 That floods, like lava, all the seething brain,  
 Leaving the lips unslaked. Fell draught ! be mine,  
 My medicine and my bane.

Mine be the shame, if others deem it shame,  
 To love unloved, nor falter suffering wrong,  
 Until beneath the earth my frame and name  
 Be buried, and my song.



*Srī Swāmī Hari Dās of Brindāban.*—By F. S. GROWSE, M. A., B. C. S.

Among the more conspicuous modern temples at Brindāban is one dedicated to Krishna under his title of Bihāri Jī, or in more popular phrase Bānke Bihāri. The Gosains, who with their wives and children now number some 500 persons, form a distinct subdivision of the reformed Vaishnavas, and are all the collateral descendants of the founder of the sect, Swāmī Hari Dās. The temple is not only their head-quarters, but appears to be the only one in all India of which they have exclusive possession. It has lately been rebuilt at a cost of Rs. 70,000; a sum which has been raised in the course of 13 years by the contributions of their clients from far and near. It is a large square red sand-stone block of plain but exceedingly substantial character, with a very effective central gateway of white stone. This has yet to be completed by the addition of an upper storey; but even as it stands, the delicacy of its surface carving, and the extremely bold projection of its eaves render it a pleasing specimen of the style of architecture now in vogue at Brindāban—one of the few places in the civilized world where architecture is not a laboriously studied reproduction of a dead past, but a still living art, which is constantly developing by a process of spontaneous growth. The estate is divided into two shares or *bats*, according to the descent of the Gosains. Their founder was himself a celibate; but his brother Jagannāth had three sons, Megh Syām, Murāri Dās, and Gopināth Dās, of whom the third died childless, the other two being the ancestors of the present generation. As is usual in such cases, the two families are at war with one another, and have more than once been obliged to invoke the assistance of the law to prevent a serious breach of the peace. Beyond the saintliness of their ancestor, but few of them have any claim to respect, either on account of their learning—for the majority of them cannot even read—or for the correctness of their morals. There are however two exceptions to the general rule—one for each *bat*—in the person of the Gosains Jagadīs and Kishor Chand; both of whom are fairly well read, within the narrow limits of their own sectarian literature, beyond which they have never dreamed of venturing.

Like all other Vaishnavas, they profess to regard the Bhagavad Gīta as the authoritative exposition of their distinctive creed; but in practice their studies—if they study at all—are directed exclusively to much more modern compositions couched in their own vernacular, the Braj Bhāshā. Of these the work held in highest repute by all the Brindāban sects is the Bhakt-Mālā, or Legends of the Saints, written by Nābhā Jī in the reign of



Akbar or Jahāngir. Its very first couplet is a compendium of the theory upon which the whole Vaishnava reform was based :

Bhakt-bhakti-Bhagavant-guru, chaturanām, vapuek :

which declares that there is a divinity in every true believer, whether learned or unlearned, and irrespective of all caste distinctions. Thus the religious teachers that it celebrates are represented not as rival disputants—which their descendants have become—but as all animated by one faith, which varied only in expression ; and as all fellow workers in a common cause, *viz.* the moral and spiritual elevation of their countrymen. Nor can it be denied that the writings of the actual leaders of the movement are instinct with a uniform spirit of asceticism and detachment from the world and a sincere piety, which are very different from the ordinary outcome of Hinduism. But in no case did this catholic simplicity last for more than a single generation. The great teacher had no sooner passed away than his very first successor hedged round his little band of followers with new caste restrictions, formulated a series of narrow dogmas out of what had been intended as comprehensive exhortations to holiness and good works ; and substituted for an interior devotion and mystical love—which were at least pure in intent, though perhaps scarcely attainable in practice by ordinary humanity—an extravagant system of outward worship with all the sensual accompaniments of gross and material passion.

The Bhakt-málá, though an infallible oracle, is an exceedingly obscure one, and requires a practised hierophant for its interpretation. It gives no legend at length, but consists throughout of a series of the briefest allusions to legends, which are supposed to be already well-known. Without some such previous knowledge the poem is absolutely unintelligible. Its concise notices have therefore been expanded into more complete lives by different modern writers, both in Hindí and Sanskrit. One of these paraphrases is entitled the Bhakt Sindhu, and the author, by name Lakshman, is said to have taken great pains to verify his facts. But though his success may satisfy the Hindu mind, which is constitutionally tolerant of chronological inaccuracy, he falls very far below the requirements of European criticism. The work is however useful, since it gives a number of floating traditions, which could otherwise be gathered only from oral communications with the Gosains of the different sects, who as a rule are very averse to speak on such matters with outsiders. It will be seen in the sequel that no dependence can be placed upon the details of the narrative, and that the dates are all hopelessly wrong. In the original Bhakt-málá of Nábhá Jí, the stanza referring to Hari Dās stands as follows :

मूल ।

आशधीर उद्योत कर रसिक रूप हरिदास की ॥  
जुगलनामो नैम जपत नित कुंजविहारी ॥



अविलोकन रहै केलि मखी सुखको अधिकारी ॥  
 गानकला मधर्व श्यामश्यामाको तोषै ॥  
 उत्तम भोग लगाय मोर मरकट तिमि पोषै ॥  
 दपति द्वार ठाढे रहै दरशन आशा जास की ॥  
 आशधीर उद्योत कर रसिक बाप हरिदास की ॥

which may be thus translated :

Tell we now of Hari Dās, the pride of Asdhār, who sealed the list of the saints ; who, bound by a vow to the perpetual repetition of the two names of Kunj-bihārī, was ever beholding the sportive actions of the god, the lord of the Gopīs' delights ; who was a very Gandharv in melodious song and propitiated Syāma and Syāmā, presenting them with the daintiest food in daily sacrifice and feeding the peacocks and monkeys and fish ; at whose door a king stood waiting in hope of an interview ; Hari Dās, the pride of Asdhār, who sealed the list of the saints.

In most MSS. of the Bhakt-Mālā each stanza of the text, or *mūl*, is followed by the *tikā* of Priya Dās composed in the *Sambat* year 1769 ; the word *tikā* in this case being more appropriately translated by 'supplement', rather than 'commentary' ; as the later writer gives no explanation of the original text, but adds entirely new matter of his own. The following is his encomium on Hari Dās :

### टीका ।

श्री स्वामी हरिदास रसराशि को वर्षानि मकै  
 रसिकताकी बाप जोरै जाप मधि पारैये ॥  
 ल्याये कोक चोवा बाकौ अति मन भावा बामै  
 डारये लै पुलनि यद घोवा हिय आरये ॥  
 जानिकै सुजान कही लै दिषावै लालप्यारे  
 नैशिकु उघारे पट सुगंध बुडारये ॥  
 पारमपपान करि जल उरवारदियै  
 कियै तब शिष्य बैसै नाना विधि मारये ॥

which may be thus rendered :

Who can tell all the perfections of Srī Swāmī Hari Dās, who by ever muttering in prayer the sacred name, came to be the very seal of devotion. Some one brought him perfume that he valued very highly ; he took and threw it down on the bank ; the other thought it wasted. Said the sage knowing his thoughts : Take and shew him the god : he slightly raised the curtain ; all was drenched with perfume. The philosopher's stone he cast into the water, then gave instruction : many are the legends of the kind.

Probably few will deny that at least in this particular passage the disciple is more obscure than his master ; and the obscurity, which is a



sufficiently prominent feature in the English translation, is far greater in the Hindi text, where no indication is given of a change of person and a single form answers indifferently for every tense of a verb and every case of a noun. The *Bhakt-Sindhu* expands the two stanzas into a poem of 211 couplets and supplies a key to all the allusions in the following detailed narrative :

Brahm-dhīr, a Sanādh Brāhman of Kol or Jalesar, had a son Gyān-dhīr, who entertained a special devotion for Krishna under his form of Giridhāri—'the mountain-supporter'—and thus made frequent pilgrimages to the holy hill of Gobardhan. On one such occasion he took to himself a wife at Mathurā, and she in due time bore him a son whom he named Ās-dhīr. The latter eventually married a daughter of Gangā-dhar, a Brāhman of Rājpur—a small village adjoining Brindāban—who on the 8th of the dark fortnight of the month of Bhādon in the *Sambat* year 1441 gave birth to Hari Dās. From his earliest childhood he gave indications of his future sanctity, and instead of joining in play with other children was always engaged in prayer and religious meditation. In spite of his parents' entreaties he made a vow of celibacy, and at the age of 25 retired to a solitary hermitage by the Mān Sarovar, a natural lake on the left bank of the Jamunā, opposite Brindāban. He afterwards removed to the Nidh-ban in that town, and there formally received his first disciple, Bithal-Bipul, who was his own maternal uncle. His fame soon spread far and wide, and among his many visitors was one day a Khattri from Delhi, by name Dayāl Dās, who had by accident discovered the philosopher's stone, which transmuted into gold everything with which it was brought in contact. This he presented as a great treasure to the Swāmī, who however tossed it away into the Jamunā; but then seeing the giver's vexation, he took him to the margin of the stream, and bade him take up a handful of sand out of the water. When he had done so, each single grain seemed to be a facsimile of the stone that had been thrown away and when tested was found to possess precisely the same virtue. Thus the Khattri was made to understand that the saints stand in no need of earthly riches, but are complete in themselves; and he forthwith joined the number of Hari Dās's disciples.

Some thieves however hearing that the sage had been presented with the philosopher's stone, one day when he was bathing, took the opportunity of stealing his *sālagrām*, which they thought might be it. On discovering it to be useless for their purpose, they threw it away under a bush, and as the saint in his search for it happened to pass by the spot, the stone itself found voice to tell him where it lay. From that time forth he received every morning by miraculous agency a gold *muhr*, out of which he was to provide the temple-offerings (*bhog*) and to spend whatever remained over in the purchase of grain wherewith to feed the fish in the Jamunā and the peacocks and monkeys on its banks.



One day a Káyath made him an offering of a bottle of *atar* worth Rs. 1,000, and was greatly mortified to see the Swāmī drop it carelessly on the ground, so that the bottle was broken and the precious essence all wasted. But on being taken to the temple he found that his gift had been accepted by the god, for the whole building was fragrant with its perfume.

Again, a minstrel at the court of the Delhi Emperor had an incorrigibly stupid son, who was thereupon expelled in disgrace. In his wanderings he happened to come to Brindāban, and there threw himself down on the road to sleep. In the early morning the Swāmī, going from the Nidh-ban to bathe, stumbled over him, and after hearing his story gave him the name of Tán-sen, and by the mere exercise of his will converted him at once into a most accomplished musician. On his return to Delhi, the Emperor was astonished at the brilliancy of his performance, and determined himself to pay a visit to Brindāban and see the master under whom he had studied. Accordingly, when he was next at Agra, he came over to Mathurá, and rode out as far as Bhat-rond—half-way—whence he proceeded on foot to the Nidh-ban. The saint received his old pupil very graciously, but took no notice of his royal companion, though he knew perfectly well who he was. At last, as the Emperor continued begging that he might be of some service, he took him to the Bihári Ghát close by, which for the nonce appeared as if each one of its steps was a single precious stone set in a border of gold; and there shewing him one step with a slight flaw in it, asked him to replace it by another. This was a work beyond the capacity even of the great Emperor; who thereupon contented himself with making a small endowment for the support of the sacred monkeys and peacocks and then went his way after receiving a most wearisome amount of good advice.

No further incident is recorded in the life of Hari Dās, the date of whose death is given as *Sambat* 1537. He was succeeded as Mahant by his uncle Bithal-Bipul; and he by Bihárin Dās. The latter was so absorbed in enthusiasm that a Sárasvat Bráhmaṇ, of Panjábí extraction, by name Jagannáth, was brought over from Kol to administer the affairs of the temple: and after his death the succession was continued through several other names, which it seems unnecessary to transcribe. Thus far the narrative of the Bhakt-Sindhu, which, it will be seen, affords an explanation of the obscure allusions in the Bhakt-Málá to the two presentations of the *atar* and the philosopher's stone, the daily feeding of the monkeys and peacocks and the Emperor's visit. In other matters, however, it is not at all in accord with the traditions accepted by the Swāmī's descendants; for they say that he was not a Sanádh by caste, but a Sárasvat; that his family came not from Kol or Jalesar, but from Uchch near Multán, and that he lived not four centuries ago, but at the most only three. It would seem



that the author of the *Bhakt-Sindhu* was the partisan of a schism in the community, which occurred about 50 years or so ago, and that he has moulded his facts accordingly; for the Jagannāth whom he brings over from Kol is not named in a genuine list of the Mahants, which will be given hereafter. That he is utterly at fault in his dates, *sambat* 1441—1537, is obvious at a glance; for the Emperor who visited Brindaban was certainly Akbar, and he did not ascend the throne till *sambat* 1612. It is true that Professor Wilson in his *Religious Sects of the Hindus*, where he mentions Hari Dās, describes him as a disciple and faithful companion of Chaitanya, who was born in 1485 and died in 1527 A. D. But although Hari Dās had imbibed the spirit of Chaitanya's teaching, I know of no ground for maintaining that there was any personal intercourse between the two; had it been so, the fact would scarcely have escaped record in the *Bhakt-Mālā* or some one of its modern paraphrases. Moreover, I have by me a small *pothi* of 680 *patras*, which gives a complete list of all the Mahants and their writings from the founder down to the date of the MS., which is *sambat* 1825. The list is as follows: Swāmī Hari Dās, Bithal-Bipul, Bihārini Dās, Nágari Dās, Saras Dās, Naval Dās, Narhar Dās, Rasik Dās and Lalit-Kishori, otherwise called Lalit-mohani Dās. Allowing 20 years for each incumbency, which is rather a high average, since only an elderly man would be elected for the post, the date of Hari Dās's death is thrown back only as far as *sambat* 1665. His writings moreover are not more archaic in style than the poems of Tulsi Dās, who died in *sambat* 1680; and therefore on all grounds we may fairly conclude as an established fact that he flourished at the end of the 16th and the beginning of the 17th century A. D., in the reigns of the Emperors Akbar and Jahángír.

Each of the Mahants named in the above list is described as being the disciple of his immediate predecessor, and each composed some devotional poems, which are known as *sákhis*, *chaubolas*, or *padas*. The most voluminous writer is Bihārini Dās, whose *padas* occupy 684 pages. In many of them he expresses the intensity of his mystical devotion in terms of exaggerated warmth, which are more suggestive of an earthly than a divine passion. But the short extract that follows is of a different character, and is of special interest as confirming the conclusion already stated as to the date of Hari Dās; since it mentions by name both the Emperor Akbar and also the death of his famous friend Bírbar, which occurred in 1590 A. D.

### ॥ राग गोरी ॥

कहा गर्व रे सतक नर ॥

स्नान स्नार को स्नान पान तन खेति चलत रे निलज निडर ॥

यहै अवधि बड विदित जग बांभन बडे भये वीरवर ॥

मरत दुखौ हियौ न जियौ कियो न मचाइ साहि अकबर ॥



\* स्वासन निकसत सुर असुर राषे रोधि काल करनर ॥  
इतहि न उतहि बीचही भूयो पूर्यो है फिरत कोनके घर ॥  
सुखद घरन हरिचरनकमल भजि वादि फिरत भटकत घरघर ॥  
श्रीविहारीदास हरिदास विपुलवल लटक लम्यो मंग सर्वेपर ॥

*Translation.*

Why boastest thou thyself, O mortal man? thy body shall be the prey of dogs and jackals, though without shame or fear thou now goest delicately. This is known throughout the world to be the end of all: a great man was the Brāhman Bīrbar, yet he died, and at his death the Emperor Akbar was sad of heart, nor himself longer lived nor aught availed. When gods or demons breathe out their life, Death holds them in his maw, suspended,† neither here nor there, but in an intermediate state. All astray and swelling with pride, on whom is thy trust? Adore Hari's blessed lotus-feet; to roam and wander about from house to house is all vanity. By the strong aid of Hari Dās, Bihārini Dās has found and laid hold of the Almighty.

The founder of the sect has himself left only two short poems, filling 41 *patras*, entitled *Sādhāran Siddhānt* and *Ras ke pada*. The former is here given both in the original text and in a translation. Most of the habitués of the temple know the greater part of it by heart, though I have ascertained that very few of them have more than the vaguest general idea of the meaning. Even the best-informed of the Pujāris—Kishori Chand—who went over it carefully with me, supplied an interpretation of some passages which after consultation with other Pandits I could see was quite untenable and was obliged to reject. The connection of ideas and the grammatical construction are often so involved, that it is highly probable my version may still be not altogether free of errors, though I have done my best to eliminate them. The doctrine inculcated does not appear to differ in any essential point from the ordinary teaching of the other Vaishnava sects: the great duties of man, by the practice of which he may have an assured hope of attaining to ultimate salvation, being defined as submission to the divine will, detachment from the world, and an unquestioning faith in the mystery of the incarnation.

॥ ० ॥ अथ श्रीस्वामीहरिदासजीकृत साधारणसिद्धांत लिख्यते ॥ ० ॥

॥ रागविभास ॥

ज्यौंही ज्यौंही तुम राषतहौ त्योंही त्योंही रहियतहै हो हरि ॥  
और नौ अचरचे पाय घरीं सु नौ कहौ कोनके पंड भरि ॥

\* One MS. for *swāsan nikasat* reads *trās nikasi na sakat*.

† *Routhna* has the same meaning as the more common term *jugālī karnā*, 'to ruminate', like a cow.



जयप है अपनौ भायौ कियो चाहै कैमें करि सकौ जो तुम राखौ पहरि ।  
श्रीहरिदासके खांमी श्यामांकुंजविहारी  
पिंजराके जनावर सौं तरफराय रहै उडिवेकौं किनोक करि ॥ १ ॥  
काहको वस नाहि तुम्हारी छपानें सब होय श्रीविहारीविहारनि ॥  
और मिथ्या प्रपंच काहेकौं भाषिये सो तौ है चारनि ॥  
जाहि तुमसौं हित तामें तुम हित करौ सबसुपकारनि ॥  
श्रीहरिदासके खांमी श्यामांकुंजविहारी प्रांननिके आधारनि ॥ २ ॥  
कवळं कवळं मन इत उत जात यानें अब कौन है अधिक सुष ॥  
वडत भांति नयत आनि राखौ नाहितौ पाव तौ दुष ॥  
कोटिकामलावन्य विहारी तानें मुहांचुहौं सब सुष लिये रहत रुष ॥  
श्रीहरिदासके खांमी श्यामांकुंजविहारी दिन देपत रहै विचित्र सुष ॥ ३ ॥  
हरि भजि हरि भज हांडि न मान नरतनकौ ॥  
जिन वंहेरे जिन वंहेरे तिलतिल धनकौं ॥  
अनमागें आगें आवैगो ज्यौं पल लागें पलकौ ॥  
कहि हरिदास सीव ज्यौं आवै त्यों धन है आपुनकौ ॥ ४ ॥

### ॥ राग बिलावल ॥

ए हरि मोसौ न विगारनकौं तोसौं न संझारनकौं मोहि तोहि परी होड ॥  
कौनघौं जीतै कौनघौं हारे परिवदी न होड ॥  
तुम्हारी मायाबाजी पसारी विचित्र मोहे मुनि काके भूले कोड ॥  
कहि हरिदास हम जीते हारे तुम नछ न तोड ॥ ५ ॥  
वंदे अपत्यार भला ॥  
चित न डुलाव आव समाधि भीतर न होड अगला ॥  
न फिर दरदर पदरदर न होड अंधला ॥  
कहि हरिदास करता किया सो जवा सुमेर अबल चला ॥ ६ ॥  
हित तौ कीजै कमलनैनसों जा हितके आगें और हित लागै फीकौ ॥  
कै हित कीजै साधुसंगतसों ज्यौं कलिमपि जाय जीकौ ॥  
हरिकौ हित असौ जैसौ रंग मजीठ ॥  
संभारहित असौ जैसौ रंगकसूम दिनदुतीकौ ॥  
कहि हरिदास हित कीजै विहारीसों और निवाह जीकौ ॥ ७ ॥  
तिनका बयारके वस ॥  
ज्यौं भावै त्यों उडाय लेजाय आपनै रस ॥  
ब्रह्मलोक शिवलोक और लोक अस ॥  
कहे श्रीहरिदास विचार देखै बिना विहारी नाहि अस ॥ ८ ॥



संसार समुद्र मनुष्य मीन नक्र मगर ओर जीव बडवंदसि ॥  
 मन बयार प्रेरे सनेहफंद फंदसि ॥  
 लोभ पिंजर लोभी मरजिया पदारथचारि पंदपंदसि ॥  
 कहि हरिदास तेई जीव पारभये जे गहि रचे हरन आनंदनंदसि ॥ ९ ॥  
 हरिके नामकौ आलस कित करतहै रे काल फिरत सर सांधे ॥  
 बेर कुबेर कछू नहि जानत चखौ फिरतहै कांधे ॥  
 हीरा बडत जवाहरसंचे कहा भयो हली दरवांधे ॥  
 कहि श्रीहरिदास महलमें वनिता वनठाढीभई  
 तब कछू न चलत जब आवत अंतकी आंधे ॥ १० ॥  
 देषो इनि लोगनिकी लावनि ॥  
 वूझत नाहि हरिचरनकमलकौं मिथ्या जन्म गवावनि ॥  
 जब जमदूत आय घेरतहै करत आप मनभावनि ॥  
 कहै श्रीहरिदास तबही चिरजीवै कुंजविचारी चितावनि ॥ ११ ॥  
 मन लगाय प्रीति कीजै कर करवा सो ब्रजबीधिन दीजे मोहनी ॥  
 हंदावनसौ वनउपवनसौ गुंजमाल साथ पोहनी ॥  
 गो गोसुतनसौं मृगी मृगसुतनसौं और तन नैंक न जोहनी ॥  
 श्रीहरिदासके खांभी श्यामकुंजविचारी सो चित जै सिरपर दोहनी ॥ १२ ॥

### ॥ राग कल्याण ॥

हरिकौ छैमोई सब खेल ॥  
 मृगलव्णा जग व्यापि रछौ है कल्लं विजौरौ न वेलि ॥  
 धनमद जोवनमद राजमद ज्यों पंखिनमें डेल ॥  
 कहै श्रीहरिदास यहै जिय जानौ तीरथकौमो मेल ॥ १३ ॥  
 मारि धनि वे मृगी जे कमलनेनकौ पूजित अपने अपने भरतारन सहित ॥  
 धनि वे गारवह वेई जे वंशरस पीवत अवन दोना ज्यों जाइ न बहत ॥  
 पंखीन छोंछि मुनिजन जेते केते सेवहि दिन कामक्रोधलोभरहित ॥  
 सुनि श्रीहरिदास हमारे पतिते कठिन न जान दें हये रापत गहत ॥ १४ ॥

### ॥ राग वरारो ॥

लाल मेरे दूधकी दोहनी ॥  
 मारग जात गहि रछौ री अंचरा मेरा, नाहिन देतहों विना वोहनी ॥  
 नागरि गूजरि ठगिलीनो मेरा लाल मोरोचनकौ तिलक साथै मोहनी ॥  
 श्रीहरिदासके खांभी रहां छैमोई न्याव है या नगरी जिन बसो री मोहनी ॥ १५ ॥



### ॥ राग कान्हरो ॥

भूठी बात माँची करि दिषावतहै हरि नागर ॥  
 निमि दिन वुनत उधेरतहै जाय प्रपंचकौ सागर ॥  
 ठाठ बनाय धरौ मिहरीकौ है पुरुषतैं आगर ॥  
 सुनि हरिदास यहै जिय जानौ सुपनेकौमौ जागर ॥ १६ ॥  
 जगतप्रीति करि देषी नाहिनें गढीकौ कोक ॥  
 कचपति रंकलौ देषै प्रकृति विरोध न वन्यो कोक ॥  
 दिन जु गये बडत जन्मनके असौ जावौ जिन कोक ॥  
 सुनि हरिदास मीत भलौ पायौ विहारी असै पावौ सब कोक ॥ १७ ॥  
 लोग तौ भूल्यौ भलैं भूल्यौ तुम मति भूल्यौ मालाधारी ॥  
 आपनौ पति बाँडि औरनिसें रति औं दारनिमें दारी ॥  
 स्याम कहत जे जीव मोते विमुष जोकौन जिन दूसरी करडारी ॥  
 कहि हरिदास जज्ञ देवता पितरनकौं शरधा भारी ॥ १८ ॥  
 जौलौ जीवै तौलौ हरि भजि रे मन और बात सब वादि ॥  
 यौस चारके हलाभला मै यू कहा लैगौ लादि ॥  
 धनमद जोवनमद राजमद भूल्यौ नगर विवादि ॥  
 कहि श्रीहरिदास लोभ चरपटभयौ काहेकी लगै फिरादि ॥ १९ ॥  
 प्रेमसमुद्ररूपरसगहिरे कैसें लागै घाट ॥  
 बेकारैदाँ जानि कहावत जानिपन्यौ की कहा परी बाट ॥  
 काह्नकौ सर सुधौ न परै मारत गाल गलीगली डाट ॥  
 कहि श्रीहरिदास जानि ठाकुर विहारी तकत न ओटपाट ॥ २० ॥  
 इति श्रीस्वामीहरिदासजीकृत साधारणसिद्धांतकेपद संपूण ॥

*Translation of the Siddhānta of Swāmī Hari Dās.*

*Rāg Bihās.*

1. O Hari, as thou disposest, so all things abide. If I would shape my course in any different fashion, tell me whose tracks could I follow. If I would do my own will, how can I do it, if thou holdest me back? (The lords of Srī Hari Dās are Syāmā and Kunj-bihāri). Put a bird in a cage, and for all its fluttering it cannot get away.

2. O Bihāri, Bihārini, none else has any power; all depends on your grace. Why babble of vain systems? they are all pernicious. To him who loves you, you shew love, bestowers of happiness (the lords of Srī Hari Dās are Syāmā and Kunj-bihāri), the supporters of all living creatures.

3. At times the soul takes a flight hither or thither; but it finds no greater joy. Discipline it in every way and keep it under, or you will



suffer. Beautiful as a myriad Loves is Bihāri; and Pleasure and all delights dwell in his presence (the lords of Srī Hari Dās are Syámā and Kunj-bihāri), be ever contemplating his manifold aspects.

4. Worship Hari, worship Hari, nor desert him out of regard for thy mortal body. Covet not, covet not the least particle of wealth. It will come to you unsought, as naturally as one eyelid drops upon the other. Says Srī Hari Dās, as comes death, so comes wealth, of itself: *or* like death, so is wealth—an evil.

*Rāg Bilāvali.*

5. O Hari, there is no such destroyer as I am, and no such restorer as thou art: \* betwixt me and thee there is a contest. Which wins or loses, there is no breaking of the condition. Thy game of illusion is wide-spread in diverse ways; saints are bewildered by it and myriads are led astray. Says Hari Dās, I win, thou lovest, but there is no change in thy love.

6. O ye faithful, this is a good election: waver not in mind; enter into yourselves in contemplation and be not stragglers. Wander not from house to house, nor be in doubt as to your own father's door. Says Srī Hari Dās, what is God's doing, is fixed as Mount Sumeru has become.

7. Set your affection on the lotus-eyed, in comparison with whose love all love is worthless; or on the conversation of the saints: that so the sin of your soul may be effaced. The love of Hari is like the durable dye of the madder; but the love of the world is like a stain of saffron that lasts only for two days. Says Hari Dās, set your affection on Bihāri, and he knowing your heart will remain with you for ever.

8. A straw is at the mercy of the wind, that blows it about as it will and carries it whither it pleases. So is the realm of Brahma, or of Siva, or this present world. Says Srī Hari Dās: this is my conclusion, I have seen none such as Bihāri.

9. Man is like a fish in the ocean of the world, and other living creatures of various species are as the crocodiles and alligators, while the soul like the wind spreads the entangling net of desire. Again, avarice is as a cage, and the avaricious as divers, and the four objects of life as the four doors of the cage. Says Hari Dās, those creatures only can escape who ever embrace the feet of the son of bliss.

10. Fool, why are you slothful in Hari's praises? Death goeth about with his arrows ready. He heedeth not whether it be in season or out of season, but has ever his bow on his shoulder. What avail heaps of

\* For a similar expression of the same sentiment compare the following lines of Sūr Dās: *Mere pāpan so, Hari, hari hau—Main garua, tum men bal thora, nāhakk Mē pichimari hau.* 'O Hari, you are vanquished by my sinfulness; I am so heavy and you so slight, that you get badly thrown.'



pearls and other jewels and elephants tied up at your gate? Says Srī Hari Dās, though your queen in rich attire await you in her chamber, all goes for nothing when the darkness of your last day draweth nigh.

11. See the cleverness of these people: having no regard for Hari's lotus feet, their life is spent to no purpose; when the angel of death comes and encompasses them, he does what seemeth him good. Says Srī Hari Dās: then is he only found long-lived, who has taken Kunj-bihāri to his soul.

12. Set your heart upon securing his love. With water-pot in hand perambulate the ways of Braj and, stringing the beads of your rosary, wander through Brindāban and the lesser groves. As a cow watches her own calf and a doe its own fawns and has an eye for none other (the lords of Srī Hari Dās are Syámā and Kunj-bihāri), be your meditation on them as well balanced as a milk-pail on the head.

### *Rāg Kalyān.*

13. All is Hari's mere sport, a mirage pervading the universe, without either germ or plant. The pride of wealth, the pride of youth, the pride of power, are all like the crow among birds. Says Srī Hari Dās: know this of a surety, all is but as a gathering on a feast-day, that is quickly dispersed.

14. O sister, how happy are the does who worship the lotus-eyed, each with her own lord. Happy too the calves that drink in the melody of his pipe in their ears as in a cup from which no drop can be spilt. The birds too are like holy men, who daily do him service, free from lust, passion, and avarice. Hearken, Srī Hari Dās, my husband is a difficulty; he will not let me go but holds me fast.

### *Rāg Barāri.*

15. O friend, as I was going along the road, he laid hold of my milk-pail and my dress: I would not yield to him unless he paid me for luck. "O clever milk-maid, you have bewitched my boy with the lustre of the *go-rochan* patch on your forehead" (O lord of Srī Hari Dās) this is the justice we get here; do not stay in this town, pretty one.\*

### *Rāg Kānhrau.*

16. O clever Hari, thou makest the false appear true; night and day thou art weaving and unweaving; thou art an ocean of deceit. Though

\* In two of the three MSS. of the poem that I have consulted, stanzas 14 and 15 are omitted and they appear clearly to be an interpolation by some later hand, being quite out of keeping with the context. They must be regarded as a dialogue between two of the Gopīs and Jasodā.



thou affectest the woman\* in form and name, thou art more than man. Hearken ye all to Hari Dās and know of a truth it is but as when one wakes out of sleep.

17. The love of the world has been tested ; there is no real accord. See, from the king to the beggar, natures differ and no match can be found. The days of many births are past for ever ; so pass not thou. Hearken to Hari Dās, who has found a good friend in Bihāri ; may all find the like.

18. People have gone astray ; well, they have gone, but take thy rosary and stray not thou. To leave thy own lord for another is to be like a strumpet among women. Syāmā declares : those men rebel against me who prefer another, and those too (says Hari Dās) who make great sacrifice to the gods and perform laboured funeral rites for departed ancestors.†

19. Worship Hari from the heart as long as you live ; all things else are vain. It is only a matter of four‡ days, what need of much baggage. From pride of wealth, from pride of youth, from pride of power, you have lost yourself in mere village squabbles. Says Hari Dās : it is greed that has destroyed you ; where will a complaint lie.

20. In the depth of the delights of an ocean of love how can man reach a landing-place ? Admitting his helplessness§ he cries, What way of escape is open ? No one's arrows fly straight, for all his boasting in street and market-place. Says Sri Hari Dās : know Bihāri to be a god who overlooks all defects in his votaries.

*End of the Siddhānta of Swāmi Hari Dās.*

\* In this stanza it is the god's illusive power, or Māyā, that is addressed, rather than the god himself.

† Thus the Vaishnavas, when they perform a Srāddh, do not repeat the names of their own ancestors, but substitute the names of Krishna, Pradyumna, and Aniruddh.

‡ The number 'four' seems to be an allusion to the four stages of life : childhood, youth, manhood, and old age.

§ The word *bekāryau* is doubtful and probably corrupt though given in all three MSS.



*A Reply to several passages in Mr. Blochmann's "Contributions to the History and Geography of Bengal," No. III.—By the Translator of the Tabakát-i-Násirí, Major H. G. RAVERTY, Bombay Army, (Retired).*

It is rarely necessary for either an author or translator to have to defend his work before it is complete, but I find I have to do this in the case of my translation of the *Tabakát-i-Násirí*; and, although I have devoted more than four years to the task of collation of MSS. and to that translation, it is likely, to judge from appearances, to turn out a very thankless one after all.

It was my duty, as a translator, to show that the Calcutta Printed Text is exceedingly incorrect and imperfect. Mr. Blochmann, in note †, page 212 of his "*Contributions to the History of Bengal*," Part I., J. A. S. B., 1873, said "the printed text is untrustworthy."

What I refer to more particularly, are certain strictures contained in IIIId portion of those same "*Contributions*", which I have just received; and, in justice to my translation and to myself, I will reply to them as briefly as possible; but, at the same time, I would remark that criticisms on the MSS. on which I have been working, might have been deferred, at least, until the translation was complete.

The first objection on the part of Mr. Blochmann is [page 275 of his "*Contributions*" No. III. in J. A. S. B., for 1875] my spelling of the word *خَلَج*. I have written *Khalj* as it is explained and spelt according to the vowel points belonging to it. I also say [in note 3, page 548 of my Translation] that it is written rarely *Khalaj* [in poetry, for the sake of rhyme]; but to imagine that I could be led, in a matter of sober history, by the "common Indian pronunciation of the adjective," how to pronounce a Turkish word is preposterous: I might as well turn the *Khalj* Turks into "*Ghiljie Patháns*" as some have done. My note to the page in question seems to be unpalatable. I have never said that the *yá-i-nisbat* could not be added, and have written it with it in several places, when my author used it—as for example—*Muhammad-i-Bakht-yár*, the *Khalj*, and *Muhammad-i-Bakht-yár*, *Khalji*. I also wrote on simple *prose*: I did not refer to "rhyme" or poetic license; but I apprehend that *Khallají* is required to rhyme with "*multají*" rather than Mr. Blochmann's "*Khalají*."

With regard to the authorities for *Malik Kutb-ud-Din's* establishing himself at *Dihlí*, I am told, "Mr. E. Thomas fixes it at 587 H. as consistent with the best authorities." But who are these best authorities? Two



326 H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* [No. 3, pages farther on, Mr. Blochmann states that "the *Tabaqát* is the only authority we possess for this period."

Now I will give an example of Mr. Thomas' "best authorities." At page 11 of his "*PATHÁN KINGS OF DEHLI*," he says: "In 587, in a more extended expedition into Hindustán, Muhammad Ghori was totally routed on the memorable field of Thanesar \* \* \* *After a year's repose* \* \* \* on the self-same battle ground, he again encountered his former adversary \* \* \* This time fortune favoured the Ghories \* \* \* By this single victory the Muhammadans may be said to have become the virtual masters of Hindústán," &c., &c.

I will take it for granted that *a year after 587* means 588 H., and that Mr. Blochmann will also allow it.

But now turn to the foot-note at page 23 of the same work. There Mr. Thomas, forgetting, apparently, what he wrote a few pages before, says:—"As regards the historical evidence to the date 587 A. H. for *the capture of Dehli* by the Muslims, it is complete and consistent with the best authorities!"

Mr. Thomas adds "and *Minháj-us-Siráj* repeats in various forms, while treating of the life of Aibeg, the confirmation of the same date." In this I cannot agree with him. Let us turn to page 139 of the Calcutta Printed Text, the foot-note, and also to my Translation, page 515, in both of which it says [leaving out the first defeat by the Hindús, but again referring to Kutb-ud-Dín's being taken captive], he "took possession of that place—Míraṭh—in 587 H. [see note 5, page 515 of my version]. From Míraṭh likewise *he issued forth in the year 588 H.*, and captured Dihlí."

These are the actual words in the different MSS. collated. It is not actually said that Dihlí was taken in 588 H., merely that Kutb-ud-Dín, in 588 H., marched from Míraṭh, and it must have been towards *the close* of that year, as will be shown farther on, according to the *Táj-ul-Ma'ásir* he had to start to relieve Hānsí in the *ninth* month of that year, and only took Míraṭh after that. It is evident, therefore, that Minháj-ud-Dín did not intend it to be understood that Dihlí was taken and made the seat of government in 588 H., unless he stultifies himself by upsetting his previous statements at pages 248, 378, 456, 457, and 464 of my Translation, which can be compared with the same places in the original MSS.

I will now leave the "best authorities" and go to facts, first mentioning, however, that, in note 9, page 469 of my Translation, I have quoted several other authors for my dates, which note Mr. Blochmann probably has not read, and, further, that they also "must have had very good MSS. of the *Tabaqát-i-Náçiri*, some of which in all probability were older" than the Calcutta Printed Text.

Minháj-ud-Dín states [pages 456—477] that troubles arose in Khwá-



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 327

razm in consequence of the outbreak of Sultán Sháh, the Khwárazmí, in 587 H. ; that, subsequently [but in the *same* year], Sultán Mu'izz-ud-Dín, Muḥammad-i-Sám, advanced into India, took Tabarhindah ; left a garrison there with orders to hold out for *six months*, and was preparing to retire [in consequence of the hot season, it being the third or fourth month, at latest, of 587 H.—April or May, 1191, A. D.] ; was defeated by Ráe Pithorá ; and had to retire, leaving the garrison still there. In the cold season of that year—five or six months after—instead of being able to return as he intended, he was under the necessity of preparing to attend his brother, Sultán Ghiyás-ud-Dín, Muḥammad-i-Sám, along with other dependent Princes and their troops, against Sultán Sháh, the Khwárazmí Prince, who threatened Ghiyás-ud-Dín, Muḥammad's dominions in Khurásán. Besides, Mu'izz-ud-Dín had been badly wounded in the first battle, and it must have taken him some time to recover. This campaign, Minháj-ud-Dín states, at pages 248 and 378, took place in 588 H., and occupied *six months*. Kutb-ud-Dín accompanied his master, and was taken captive by the Khwárazmís, but, after a battle, and defeat of the enemy, he was re-captured. "This victory," says Minháj-ud-Dín, "was achieved in the year 588 H."

I also take it for granted that Mr. Blochmann will allow that this capture of Kutb-ud-Dín must have taken place *before he captured Dihlí*. But what will totally overturn the theories on this matter, unless people *will not* be convicted, is the fact that Minháj-ud-Dín's relative, Kází, Muḥammad, the Túlakí [Mr. Dowson's "Kází Túlak"], was left with a body of troops to hold Tabarhindah for the space of *six months* [that is to the next cold season—the ninth or tenth month of 587 H.—September or October, 1191 A. D.]. Why did he do this it may be asked ? and the answer is plain enough : he could not remain in India any longer with safety. The hot season was close at hand, and he would have been unable to return if he stayed much longer, for, besides the heat, the six mighty rivers in his rear would have *all been unfordable*, and would have to be crossed by boats, even if boats were procurable, a dangerous matter with regard to most of those rivers at that season, witness the strong Railway Bridges washed away in these days. The Sultán, having been defeated immediately after he placed the Kází in Tabarhindah, and having subsequently to accompany his brother towards Marw, where they were occupied *six months*, could not return as he intended, and the Kází having held out *over thirteen months* [see Translation, page 464], the Sultán still not having come, had to give it up to the Hindús.

Now if we calculate, say, fourteen or fifteen months from the first defeat, for the Sultán's return [*i. e.* from the setting in of the hot season—the *ninth* month of 587 H.] we shall come to the *last month* of 588 H. ; and, in the same way, if we calculate six months of 588 H. for the opera-



tions in Khurásán, we must allow some little time for the Sultán to reach Ghaznín, and he would then even require a month or two to prepare for a campaign in India; and besides, *even if he were ready before*, he could not move towards India during the height of the *hot season*. There were the same six mighty rivers to be crossed, and all unfordable at that period; and all these things being thought of, it was utterly impossible for Sultán Mu'izz-ud-Dín, Muḥammad-i-Sám, to have entered India, at the earliest, before the middle of September or October—the end of the ninth or tenth month of 588 H., previous to which period no man in his senses, would have attempted to march from Ghaznín, to cross the six rivers, and advance into India.

Then followed the battle with Ráe Pithorá, Kuṭb-ud-Dín is left in charge at Kuhrám, and the Sultán prepared to return home again.

These being the facts, how is it possible, on Mr. Thomas's "best authorities," that Kuṭb-ud-Dín could have occupied Dihlí in 587 H.?

I am glad also to find that General Cunningham, on his visit to Dihlí in 1862, considered that 589 H. and not 587 H. was the correct date on the *Minárah*—not of "Quṭbuddín Aibeg," about which so many reams of paper have been written, but of a wholly different Kuṭb, respecting whom see note 6, page 621, to my Translation. I refer to the date on this *Minárah* about which "doctors disagree," and with regard to which Mr. Thomas would fix on 587 H. for the occupation of Dihlí, and so all other dates must be made to suit it. I suppose, however, that all the "best authorities" never considered *how it could be possible* for Sultán Mu'izz-ud-Dín to be defeated by Ráe Pithorá just before the hot season of 587 H., to take "a year's repose" [Thomas], again enter India, be occupied some time even then against Ráe Pithorá before finally overthrowing him [according to the Táj-ul-Ma'áṣir also], leave Kuṭb-ud-Dín at Míraṭh, retire again from India, for Kuṭb-ud-Dín, subsequent to all this, to occupy Dihlí, build a great Mosque, upon which [notwithstanding the address of the President of the Archæological Section at the Oriental Congress of 1874] Musalmán artizans brought from different parts of Asia were employed, and all these events to have happened in the one year of 587 H. ! The idea is simply preposterous.

It occurs to me, on considering this subject further, that the inscription on the fourth circlet of the lower storey of the *Minárah* as given in Thomas [Pathan Kings, pages 21-22] refers not to Mu'izz-ud-Dín, Muḥammad, son of Sám, if the *name* given is correct, but to his elder brother. It will be found at pages 368 and 370 of my Translation, and in the corresponding places in the original, that the elder brother and suzerain of Mu'izz-ud-Dín, Muḥammad, son of Sám, was first called Muḥammad and his title was Shams-ud-Dín, and that the younger brother *was also called Muḥammad* and his title was Shiháb-ud-Dín. The first brother after he



came to the throne, assumed the title of "Ghiyās-ud-Dunyá wa ud-Dín, Muḥammad, son of [Bahá-ud-Dín] Sám, Kaṣím-i-Amír-ul-Múminín," and that after the successes in Khurásán, in 588 H., the younger brother, Muḥammad, who, up to that time, bore the title of Shiháb-ud-Dín, *received the title of* Mu'izz-ud-Dín, so, when defeated by Ráe Pithorá, he bore the title of Shiháb-ud-Dín, but after, on his return the second time, Mu'izz-ud-Dín. This may account for the subsequent Indian Muḥammadan writers calling him Shiháb and Mu'izz indiscriminately.

At the period in question, when these inscriptions *are said* to have been recorded [I fancy they were recorded subsequently. See note 6, page 621, of my Translation], the elder brother and *suzerain* was still living, and lived for *ten years after*; and, I imagine, it will be allowed, that the two sovereigns, and both the brothers, *at the same identical time*, could not bear the title of Kaṣím-i-Amír-ul-Múminín, or Ghiyās-ud-Dín, and, therefore, leaving out the additional titles, the work of the artist probably, the title in the said inscription is,—“SULTÁN-US-SALÁṬÍN, GHIYÁS-UD-DUNYÁ WA UD-DÍN, MUḤAMMAD, BIN SÁM, KAṢÍM-I-AMÍR-UL-MÚMINÍN,” and throughout the inscription [given by Thomas] the name of *Mu'izz-ud-Dín*, or *Shiháb-ud-Dín* even, *never once occurs*.

The Táj-ul-Ma'áṣir is quoted as an authority, and a sufficient authority, to upset the statements of Minháj-ud-Dín, whose father, Saráj-ud-Dín, was Káẓí of Sultán Mu'izz-ud-Dín's army, and whose kinsman, the Káẓí of Túlak, was present on the spot; but I do not place trust in the statements contained in that inflated work, unless they are corroborated or confirmed by some other contemporary writer.

In ELLIOT [page 211, vol. ii.] it is stated that the Táj-ul-Ma'áṣir is *rare* in Europe. I have had *four* copies to compare with the extracts from it given in that work, and I find that the date mentioned there—587 H.—for the victory Sultán's [it totally ignores his *defeat*] over Ráe Pithorá, is written سنه سبع [which may be either سبع or تسع] without any points in two copies of the four MSS., in the third with one dot over and one under, and in the fourth تسع. It is, therefore, evident that that date may be either 7 or 9, just as one chooses to read it; but, as the first battle, *according to every other author who has written on the subject*, took place in 587 H., the same year, 587 H., cannot, for reasons already stated, be the same in which the Sultán defeated Ráe Pithorá, and the former's slave occupied Dihlí. See note 6, page 521, para. 3 of my Translation.

If the “best authorities” had looked at the Táj-ul-Ma'áṣir attentively however [see also ELLIOT, vol. ii., page 217], they would have found that, even according to that work, in Ramaẓán, the *ninth month* of 588 H.—the middle of October [1192 A. D.]—Kuṭb-ud-Dín had to march from Kubrám to relieve Hánsí [see also note 2 to page 516 of my Translation], and that,



330 H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* [No. 3, *subsequently*, "When" [according to ELLIOT, page 219], "the chief luminary threw its shade in the sign of Libra, and temperate breezes began to blow, after putting to flight the army of heat, Kutbu-d-Din marched from Kabram and took Mirath," and *subsequent to that* "he then encamped under the fort of *Delhi, which was also captured.*" This means 587 H. I suppose?

If Mr. Blochmann will look at "that excellent work" the *Haft-Iqlim*, he may see therein stated, that the defeat of Mu'izz-ud-Din, Muhammad-i-Sam, took place in 587 H., his victory in 588 H., and that Dihli was occupied, as the seat of government, in 589 H.

The *Tabakat-i-Akbari*, the author of which "*must have had good MSS. older than*" mine, also says, "defeated 587 H., victorious 588 H., Dihli occupied and made the seat of government by Kutb-ud-Din, in 589 H."

The *Tazkarat-ul-Muluk* also says, first battle and defeat of Mu'izz-ud-Din, 587 H., his victory 588 H., Dihli *taken* 589 H., and, next year, 590 H., Mu'izz-ud-Din came again on an expedition to *Kinnauj*.

The *Tarikh-i-Alfi* says that the Sultán gained the victory over Ráe Pithorá in the year 578 of the *rihlat* = 588 H.

The *Zubdat-ut-Tawarikh* also says that Dihli was made the seat of government in 589 H., and that, in the following year, 590 H., the Sultán returned on the expedition against *Kinnauj*.

The *Muntakhab-ut-Tawarikh* likewise says that Dihli was made the seat of government in 589 H.

Búda'úní and *Firishtah* also will be found to agree with the *Tabakat-i-Akbari*; and, to crown the whole, and put the finishing touch to the picture, Mr. Blochmann's own *Ain* says that the first battle and defeat of the Sultán took place in 587 H., the second and victory in 588 H., and that in *the same year* his slave *took* Dihli, but nothing is said of his making it the seat of government; and this agrees with the *Táj-ul-Ma'asir*, where nothing is said of making Dihli the *capital in that year*; but that, "from Dihli," after staying some time there, "he marched forth against Kol, in 590 H."

I need not say more on this head I think, and do not doubt but that Mr. Thomas is open to conviction.

The next matter is the conquest of Bihár by Muhammad, *bin Bakht-yár*, the *Khalj*, which Mr. Thomas fixes at 599 H. on the authority, Mr. Blochmann "believes" of the *Táj-ul-Ma'asir* [ELLIOT's version probably], which states that Kutb-ud-Din took *Kálinjar* in that year; but the MSS. of the *Táj-ul-Ma'asir* examined by me, unfortunately, have that same stubborn *سنة* and what makes the date still more doubtful *سنتين*—viz.: *سنة سبع وسنتين وخمسة* which, from the want of diacritical points, may be 577, 579, 597, or 599, just as the reader chooses to render the words.



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 331

At page 523 of my Translation [note, para. 2] I have noticed that "it is astonishing that the Musalmáns remained quiet for *six years*," assuming that 599 H. was the correct year in which Kálinjar was taken, which, I add, "was the same year in which Sultán Ghiyás-ud-Dín died," but, from the examination of these four MSS. of the *Táj-ul-Ma'áṣir* again, I am in doubt whether 597 H. is not the most correct *according to that work*. Minháj-ud-Dín says the Sultán died in 599 H., but, as I have noticed in note 4, page 383, some authors give 597 H., and some 598 H. as the date of his death.

Those who suppose that Bengal was "conquered" [the surprise and capture of Núdíah I refer to] in 599 H., do not consider how Muḥammad, *bin* Bakht-yár, could have "reigned," as he is said to have done, "*twelve years*," seeing that he was assassinated in 602 H.

I am told that I am mistaken, according to my own authorities, in connexion with the very doubtful date in the *Táj-ul-Ma'áṣir* above referred to. Mr. Blochmann says, page 276, Part III. of his "*Contributions*":—

"(1) That Muhammad Bakhtyár appeared before Qutbuddín in *Dihlí*, and was rejected by reason of his humble condition.

"According to Major Raverty, *Dihlí* was occupied in 589 H.\*; hence Muhammad Bakhtyár must have been rejected in or after 589 H.

"(2) After his rejection, Muhammad Bakhtyár goes to *Badáon*, where Hizabr gives him a fixed salary.

"(3) *After some time* Muhammad Bakhtyár goes to *Audh*, where he obtains certain fiefs near the *Bihár* frontier. He now undertakes plundering expeditions, which continue, according to the printed text, *for one or two years*.

In a foot-note is added, "Major Raverty has left this out."

"(4) He invades Southern *Bihár*† and takes the town of *Bihár*. He then goes to *Dihlí*, where he remains for some time at Qutb's court.

"(5) *The second year after his conquest of Bihár*, he sets out for *Bengal*, and takes *Nadiyá*.

"Now how is it possible, with these five chronological particulars, that "Muhammad Bakhtyár could have left *Bihár*, as Major Raverty says, in 589 H. to invade *Lakhnautí*, if Qutb occupied *Dihlí* in 589?" [A foot-note has, Major Raverty says that Muhammad Bakhtyár presented himself to *the Sultán* at *Láhor*, but the text has *Dihlí* (page 549).] "It would, indeed, "be a close computation if we allowed but five years for the above events, "i. e. if we fixed the conquest of *Bengal* as having taken place in 594 H., "or A. D. 1198."

\* Early in 589 H.

† It should have been stated above that his fiefs were close to the frontier of South *Bihár*, as in my translation.



To this my reply is that the text (page 549), says *not one word* about "Muhammad Bakhtyár" presenting himself before "*the Sultán at Láhor*" [*the Sultán*" in this instance was a *slave*, continued a slave during his master's lifetime, and did not obtain his freedom and the title of Sultán until 605 H.—only *about fifteen years after this time*! See page 389 of Translation, and corresponding place in the original]. The words in my Translation are, that "Muhammad-i-Bakht-yár presented himself *before the Muster-Master at Dihlí,*" and so, the probability is, that Malik Kutb-ud-Dín was at Láhor, as I have stated in note 6, page 550, *on the authority of another writer*, and Muhammad, bin Bakht-yár, straightway went to Husám-ud-Dín, Ughul-Bak.

If looked at in a different light, although the time seems very short, it is not so utterly impossible for Muhammad, *bin* Bakht-yár, to have waited on Kutb-ud-Dín at Láhor, or gone to Ughul-Bak, as the case may be, proceeded to Awadh, have been sent to Bhíulí and Bhagwat, have taken Bihár which only required a party of 200 horsemen (in fact, it may be said Muhammad, *bin* Bakht-yár, took it alone) and might have occupied him a couple of weeks, or even say a month from his fiefs, a distance of under 200 miles as the crow flies, have gone to Dihlí to Kutb-ud-Dín in 589 H. or to Mahobah, as the case may be, and have invaded Bengal the following year, for *the second year after* means the following year—I quote my authors as I find them. That in the *following year after* 589 H., he took Núdiáh, agrees with the statement of Shíam Parshád, whose work Mr. Blochmann, of course, has referred to; but he appears not to have noticed the statement of Minháj-ud-Dín at page 556 of my Translation [page 150 of the printed text], that when Muhammad, *bin* Bakht-yár, *returned* from the presence of Kutb-ud-Dín, *he* subdued Bihár, thus contradicting his previous statement.

The only thing I can blame myself for in this matter is, that I did not mention in a note, that the printed text, which at one time is so utterly untrustworthy, and then so trustworthy, contained the words "*matters went on in this way for ONE or TWO years*" after the words "and ravaged that territory," at page 551 of my Translation. The reason why I did not do so is, that, in all probability, I did not look at the printed text here, or that it escaped my attention, otherwise I certainly should have done so: I think I have noticed the printed text pretty often, when *right* as well as when *wrong*. I had no object not to do so: I had built up no theory or made statements anywhere else that I wished to support. I might also have added that the two MSS. on which that printed text is based, two of the three worst of those collated, contain the same words, and that all the other collated *MSS.* had no such words.



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 333

I would, however, remark here that I did not profess to translate the Calcutta Printed Text, but to translate the work from MSS., and as advertised on the covers of the Society's publications.

Why the expression "some years before 601 H." can make it clear ["Contributions," page 277] that Núdíah "must have been taken about 594 H. or 595 H., i. e. in A. D. 1198 or 1199," any more than about 591, 2, 3 or even 596 or 7, I am at a loss to understand. But one thing, at least, is very clear, that the year 599 H. for the conquest of Bengal, even "as consistent with the best authorities," is utterly impossible.

Another theory is then raised. Although it is clear to Mr. Blochmann that Núdíah "must have been taken in 594 or 595 H.," the statement contained in the Táj-ul-Ma'ásir [*Firishtah*, who merely copies from his immediate predecessors, more particularly, is a *very* trustworthy authority to quote!] that Muḥammad-i-Bakht-yár waited on Kuṭb-ud-Dín at Mahobah in 599 H.—a doubtful date in that work, as before stated, which may be 597 H. and *four or five years after* Mr. Blochmann says Bengal was conquered—"involves no contradiction as far as chronology is concerned." No, not in the least, even though Minháj-ud-Dín states, that Muḥammad-i-Bakht-yár waited on Kuṭb-ud-Dín *before* he surprised Núdíah. With that city Bengal—or rather Lakhanawati—fell. There is no mention of any fighting after; and so, if it is correct, according to the Táj-ul-Ma'ásir, that Muḥammad-i-Bakht-yár only waited on Kuṭb-ud-Dín at Mahobah, in 599 H., not *from* AWADH and BIHAR as incorrectly rendered in ELLIOTT's version, [page 232, vol. ii.], but from ادوند بهار—the points are thus given—according to the text of the Táj-ul-Ma'ásir, I now have before me, that city could only have been taken after that time—599 H. See also footnote page 276 of the "Contributions," in which it is contended that ادوند—as Minháj-ud-Dín writes it—cannot be correct because the Calcutta Text has اوند. The author of the Tabakát-i-Akbarí, like some others, takes Muḥammad, son of Bakht-yár, from the presence of Mu'izz-ud-Dín *direct* to Husám-ud-Dín, Ughal-Bak, and says, that Muḥammad-i-Bakht-yár, when subsequently he came to Kuṭb's presence, "was deputed to conquer Lakhanawati."

The Tazkarat-ul-Mulúk also takes Muḥammad-i-Bakht-yár *direct* from Ghaznín to Ughal-Bak, and states that he took Bihár before he went to Kuṭb-ud-Dín].

"The time fixed upon by Mr. Thomas for the conquest of Bengal is 599 H., that is, *four or five years after* the time assumed by Mr. Blochmann, while I have stated, according to my author, the year following 589 H., that is 590 H.—but *three or four years before* Mr. Blochmann's chosen time. Mr. Thomas is only "a little too late:" mine is "impossible as being too early." Probably Mr. Blochmann has not noticed that at page



334 H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* [No. 3, 340 of the *Ro. As. J.*, vol. vi. for 1873, Mr. Thomas has again *changed in his ideas*, and says “*the first occupation of Bengal by Muhammad Bakht-yár Khilji*” was “in 600 A. H.”

I now come to another chief point in this discussion.

Mr. Blochmann “thought” the name of “Qutbuddin of the Paralyzed Hand,” [see BRIGGS’ translation of Firishtah, noticed in note at page 519 and 521 of my Translation, which makes a very energetic warrior of him, considering his “Paralyzed Hand”], had been “set at rest” by Mr. Thomas—but in this I cannot agree any more than in the date 599 and 600 H. for the conquest of Bengal—and says that my different MSS. “have clearly the same words as the Bibl. Indica Edition of the *Ṭabaqát*”: my MSS. run thus:—

بظاهر جمالی نداشت و انگشت خنصر او شکستگی داشت

but, in the Calcutta Text, after the word او, the words از دست—“of a” or “the hand”—occur, and the Hamilton MS., the worst of the whole number collated, has the same, but *the other two MSS. from which the Printed Text is taken have not those words*, and another MS. has از پا—“of a” or “the foot”—but all the rest of the MSS. are as I have given it above, and translated it.

I fail to see much difference in Mr. Blochmann’s “literal translation:”—“*Outwardly he had no comeliness, and his little FINGER [of one hand] possessed an infirmity. For this reason they called him Aibak-i-shall [Aibak with the paralyzed HAND]*” and my:—“He possessed no outward comeliness, and the little *finger* [of one hand?] *had a fracture*, and on that account he used to be styled I-bak-i-Shil [the powerless-fingered].” The only difference is that where I translate داشت *had*, Mr. Blochmann translates it *possessed*—a mighty difference truly—and that I translate the word گفتندی—*guftandí* which is the *imperfect* tense of the verb, used also to imply continuity or *habitude*, and is *not the PAST tense*, and that I give to شکستگی the meaning of a concrete noun. I see no reason to alter my translation, as lexicographers, who are supposed to know something of the meanings of words, render شکستگی *a rupture, a fracture, defeat, as well as breaking, brokenness, &c.*

Mr. Blochmann calls the *Haft-Iklím* “an excellent work,” and in this I quite agree with him. Let him look at it, however, and he will find with respect to Kutb-ud-Dín, I-bak-i-Shil, that, in it, are the following words—از این که انگشت خنصر او شکسته بود او را ایبک میگویند—which I defy any one to translate otherwise than—*from, or on this, that his little FINGER WAS BROKEN they used to call him I-bak.*” Which hand is not stated.

The author of the *Ṭabaqát-i-Akbarí*, Budá’úní, and even Firishtah, all of whom Mr. Blochmann states [*“Contributions,”* page 280], MUST HAVE



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 335

HAD very good MSS. of the *Ṭabaqāt-i-Nāqirī*, all have THE VERY SAME WORDS, copying one from the other, as are contained in the *Haft-Iklim*, the *Tazkarat-ul-Mulūk* has the same, and also the *Muntakhab-ut-Tawārikh*. Some others say the same, but I need not name them here, as those I have mentioned are easily obtained for reference, but all leave out the شل without which ايبك—finger, is meaningless. Mr. Blochmann quotes the *Shams-ul-Lughat*: let him look at it for the word ايبك and he will see these words—ايبك بكسر بمعني انكشت—“*I-bak with kasr means FINGER*,” as well as the other meanings mentioned in the “*Contributions*.”

The *Tārikh-i-Majāmi'-ul-Khiyār*—not the work even of a resident in India—has چون انكشت خنصر او شكسته بود اورا ايبك شل گفتند—“As his little finger was broken, they called him *I-bak-i-Shil*.” The *Zubdat-ut-Tawārikh*, which copies *Minhāj-ud-Dīn*, has the same words as given in my Translation; and it is satisfactory to know that those authors who say his little finger was broken, read the word شكستكي as I have read it. Of course, neither *Minhāj-ud-Dīn*, nor any other who writes *I-bak-i-Shil* which even, on Mr. Blochmann's own showing, is in the Calcutta Printed Text as in other copies, is right in putting شل whether it be *shil* or *shall* LAST, and it ought, according to Mr. Blochmann, to be inverted into “*Shil-Aibak*,” otherwise it is “*un-Persian*.” None of these authors who write *I-bak-i-Shil* therefore, according to this theory, could have known their own language! He also, in his literal translation, renders the passage “and his little finger [of one hand] possessed an infirmity,” and yet he turns him into “*Aibak with the paralyzed HAND*.” Because one finger was broken, or “possessed an infirmity,” it does not follow that the whole hand was paralyzed. Mr. Blochmann could not have thought of these matters when he proceeded to criticise the correctness of my Translation.

I have never said that *I-bak* alone meant *I-bak of the broken finger*, but, with *shil* added to it—*I-bak-i-Shil*—as I have already stated in note 1, page 513-14 of my Translation, and I have also stated that, in *Turkish*, *I-bak* “means finger” only: not broken or fractured-fingered, or the like. Mr. Blochmann could not have read the notes through, or failed to see what I said of *I-bak-i-Lang* in the same note. Nor have I said that *I-bak* was not Turkish, for he was a *Turk*, and so bore a Turkish name.

Neither have I ever hinted, much less stated, that his *real name* was *Ḳuṭb-ud-Dīn*: to have said so would have been absurd. That is his Musalmán titular name only, as *Shams-ud-Dīn* was the Musalmán name title of his slave, *I-yaḷ-timish*. In my note 1, page 513, I have said that *Ḳuṭb-ud-Dīn* could not have been his *real name*, nor *I-bak* either, which I looked upon as a nick-name or by-name. So Mr. Blochmann here, unknown to himself probably, has come to the same conclusion. I should not write his name however under any circumstance “*Ḳuṭbuddīn*,” any more than I



336 H. G. Raverty—*Reply to 'Histy, and Geogr. of Bengal, No. III.'* [No. 3, should translate it *Thepoletarofthefaith*, but Kutb-ud-Din—The Polestar of [the] Faith.

There is not the least cause for “the *izáfát*” to be cancelled in I-bak-i-Shil: to do so would be contrary to the primary and simplest rules of the Persian Grammar—the Irání I mean—of the “Túrání” dialect I know nothing. In Shil I-bak an adjective precedes the noun, and the *izáfát*—*izáfát*—does not take place; but, when the adjective or qualifying word follows the noun, the *kasrah* of *izáfát* is required. See the “Áin,” page 629 for an example, where Mr. Blochmann himself writes “A'ZAM KHÁN, vide KHÁN-I-A'ZAM.” Any Persian Grammar, however simple, will show this, as well as Lumsden, or Sir W. Jones, Forbes, &c. The following is given as an example, and is very pertinent to the subject:—

“The last letter of every Persian word is quiescent, or un-accented—i. e. *ساکن* *asp*, a horse; *دست* *dast*, a hand; *مرد* *mard*, a man. But, in composition, when such word is either the *مضاف*—*muẓáʿf*, or governing noun, or the *موصوف* *mauṣúf*, or substantive noun, the last letter must be accented with the *kasrah* of *izáfát*: as for example—*اسب جلد* *asp-i-jald*—a swift horse; *دست زید*—*dast-i-Zaid*—the hand of Zaid; *مرد نیک* *mard-i-nek*—a good man; *راه راست* *ráh-i-rást*—a true or right way, the *kasrah* being the sign of the governing noun, or the antecedent of the relative adjective.”

Again: “When the adjective follows the substantive, the latter must be accented with the *kasrah*; as *اسب سیاه* *asp-i-siáh*—a black horse, but, on the contrary, when the adjective precedes the noun, the *kasrah* must not be used, as *سیاه اسب* *siáh asp*—a black horse. The same rule is likewise applicable to the governing and the governed nouns substantive; as *زمین بادشاهان*—*bádsháhán-i-zamín*—kings of the earth; *شاه جهان* *sháh-i-jahán*—king of the world; *جهان شاه* *jahán-sháh*—world king,” &c.

When I learned these simple rules just *thirty years since*, I did not expect I should have to quote them again. Shil I-bak therefore and I-bak-i-Shil, and I-bak-i-Lang, as he is styled in the *Jámi'-ut-Tawárikh*, and in *Fanákatí*, come under these rules, but no writer who pretended to elegance of style would prefer the former to the latter. I am quite content to leave this to any Persian scholar—Persian or European. In *میر ما* which Mr. Blochmann himself translates [page 136] “*Lord of the Moon*,” why is he so *un-Persian*, and why does he not “cancel the *izáfát*,” and write Moon Lord? and without an *artificial izáfát* whence comes “*of the*?”

I do not know that any one has said that Mr. Thomas is *not* quite correct in looking upon *ایبک* as “the original name.” I, certainly, have not said so. I only write I-bak what Mr. Thomas writes *Aibeg* and Mr. Bloch-



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 337

mann *Aibak*, but I think Mr. Blochmann would have some difficulty in showing me the word written with a *madd*, viz. ايبك. He certainly cannot show it to me in any copy of the *Ṭabaḳāt-i-Nāṣirī*. I never saw it so written.

As to what is given as the legend on coins he is said to have issued, and his being merely called *I-bak* therein, which Mr. Blochmann deems quite sufficient to refute me by my own remarks, it is evident that, before Mr. Blochmann had calmly read my statements, he penned this portion of his "*Contributions*." I read in the legend given at page 525 of my Translation the words—Sultān Kutb-ud-Dīn, *I-bak*, as plain as it is possible to print. He would scarcely have put *shil* or *shall* upon his coins. Did Tīmūr add the word *Lang* to the legend on his? Of course not: but I will not give the legend here. See the ADDITIONAL NOTE to my Translation, on the subject of the legends on these coins: end of Nāṣir-ud-Dīn, Maḥmūd Shāh's reign, page 717.

I do not consider that Mr. Thomas or any one else has "set this question at rest" with respect to "*Aibeg*;" and had Mr. Blochmann not been quite so hasty he might have read a note in my Translation, a little farther on, where I have remarked upon the number of other Maliks styled ايدك—some five or six or more, including Ulugh-Khān's brother. I have endeavoured to get a real Turkish scholar to give me his ideas upon several Turkish titles in the *Ṭabaḳāt-i-Nāṣirī*, and perhaps, before this is sent off, I may receive his reply.

As to there being no such word as *shil* in Persian meaning limp, weak, soft, paralyzed, &c. ["*Contributions*," page 278] I do not agree with Mr. Blochmann. It is not *Tūrānī*, and may be *Irānī*, or possibly local, and peculiar to the Fārsīwāns of Afghānistān, but is commonly used; and another Persian word—*shul*—is used with it in the sense mentioned. As to Mr. Blochmann's "*rare Arabic word shal or shall* [which "*rare*" word *I have also referred to* in my note, page 513], he says it means "having a withered hand," but I say it means a *hand* or *foot* paralyzed or powerless, &c., on the authority of an excellent Lexicon in Persian, which explains it thus:—

و بعربي دست و پای را گویند که از کار باز مانده باشد

I think I may venture to assert that Sultān Mu'izz-ud-Dīn, Muḥammad, son of Sām, was rather unlikely to have purchased a slave with the whole of one *hand* paralyzed: a finger broken or paralyzed would have been no very great detriment, but how could a one-hand paralyzed man fight on horseback? See too the wonderful feats Dow and Briggs—not Firishtah—make him perform. As to its being "*a rare Arabic word*" I beg to say that it is a *most common* one among the Afghāns: in fact, they rarely ever use another word, except by adding شل *shull* to it—"*shall-o-shull*." See my Pushto Dictionary, page 656.



338 H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* [No. 3,

In the following page [279] of his "*Contributions*" Mr. Blochmann, referring to my mentioning in a note to my Translation, that Arám Sháh, said to be the son of I-bak, and, by some, the adopted son, is called I-bak's brother by Abú-l-Fazl, says he takes "the opportunity to justify Abul-Fazl, and that, in his [own] Áin text, Abul-Fazl states twice distinctly that Arám Sháh was Aibak's son." Mr. Blochmann's Áin may, but in my Áin—the MS. I quoted, and which is now before me—a "good old copy"—has these words, in which *may be* a clerical error:—

در چوكان بازي نقد زندگاني در باخت امرا آرام شاه برادر اورا برمسند فرماندهي  
نشانده

At page 279 of his "*Contributions*" Mr. Blochmann considers the word آي *ái* "a moon" in the word ايدك to occur in other names of Indian History, and in what he calls "*Ai-tigin*" or *E'tigin* [he is not certain which perhaps: آي can be written *E*, in *Túrání* probably], and in "*Ai-lititnish*, the emperor Altamsh," but unfortunately آي with *madd* over the *i* does not occur in either of those names, nor will Mr. Blochmann show them to me so written even in the *Bibl. Indica* edition of the "*Ṭabaqát*."

If "*Ai-lititnish*" be the name of the so-called "emperor" [but why not write also the "emperor" Maḥmúd, son of Sabuk-Tigin, the "emperor" Mu'izz-ud-Dín, and the "emperor" Kuṭb-ud-Dín? They were Sultáns by title as well as "*Ai-lititnish*" was],\* and if "*Ai-lititnish*" be right, why style him "Altamsh" still? Such must be "behind modern research." If آي be contained in the words ايتكين and ايلتمش—there are no *madds* here—and is entirely separate from the تكين and لتمش of those words, how does Mr. Blochmann account for the words قلمش Kal-timish, قتمش Tak-timish, and ستمش Sal-timish? These are names often occurring as well as ايلتمش\*—*I-yal-timish*, elsewhere than in Indian history, because they are Turk names, but the last part of these compound words is تمش sometimes written تميش and قتمش and the first part قل—تق—سل and ايل respectively, and not آي at all. After this same fragile theory, *I-yal-Arsalán*—ايل ارسلان, *I-yal-ká*—ايلكا, and *I-yal-dúz*—ايلدوز which latter the author of the *Ṭabaqát-i-Násirí* and some others write يلدوز *Yal-dúz* [where is the "آي *ái* 'a moon'" here? ايلدوز is said to mean *a star* in Turkish], those names must be written *Ai-liarsalán*, *Ai-liká*, and *Ai-lildúz*. I should like to know the titles of these "oldest Dictionaries" which give the pronunciation "*Ai-lititnish*." No, no, the "آي *ái* 'a moon'" in these last names is all *moonshine*.

Again Mr. Blochmann makes everything succumb to "metrical passages" and poetry while I treat of prose.

I have included the name of ايلتمش\*—*I-yal-timish*, as one of my

\* Major Raverty's original contains *sukúns* above the *lám*, *mím*, and *shín*. Ed.



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 339

three oldest MSS. of the Ṭabaqāt-i-Nāṣirī writes it *with the points*, among the Turkish titles or by-names referred to a Turkish scholar.

In the order of Mr. Blochmann's strictures I come now to "dangerous innovations" in spelling names, but, for convenience, I will notice them last, and proceed to another most important point. He says, page 279 :—

"The only thing we knew hitherto (and I believe it is all we know now) is that the conqueror of Bengal was called

Muhammad Bakhtyār,

and the name of his paternal uncle was

Muhammad Mahmūd.\*

"The names of these two persons Major Raverty breaks up, by introducing an artificial *izāfat*, or sign of the genitive" [see *ante* on the use of the *izāfat* and the *توصيفي كسر* and any Grammar on the subject], "into four names, *viz.* Muhammad-i-Bakhtyār, and Muhammad-i-Mahmūd \* \*

"Major Raverty says in explanation that "in his older MSS." the word *bin*, or son, is inserted between the words Muhammad and Bakhtyār in the heading of Chapter V., which contains the biography of the conqueror of Bengal; hence the conqueror of Bengal was Muhammad, and "the father's name, it appears, was Bakhtyār, the son of Mahmūd." It is not stated in how many MSS. this *bin* occurs; but, though it occur in the heading, it never occurs in the text.

"The name of Muhammad Bakhtyār occurs more than thirty times in Major Raverty's Chapters V. and VI. (pages 548 to 576); but in every case Major Raverty gives Muhammad-i-Bakhtyār, *i. e.* the *Izāfat*. Hence his MSS. have no *bin* in the text. In the heading of Chapter VI., there is no *bin*, though Major Raverty puts it in; he tries even to do so in the heading to Chapter VIII., in the name of Husámuḍḍin 'Iwaz, and "one or two authors" get the credit of it."

My answer is, I "put" nothing "in": "nor does the word *bin* occur in the MSS. of the Táǵ-ul-Maáṣir, in Firishtah, the Ṭabaqāt-i-Akbarí, "Badáoní, and later writers, though the authors of these histories must have "had very good MSS. of the Ṭabaqāt-i-Náṣirí, some of which in all probability were older than those in Major Raverty's possession. Hence I "look upon the correctness of the solitary *bin* in the headings of some of "Major Raverty's MSS. as doubtful." The Táǵ-ul-Ma'áṣir has no *Arabic headings* like the Ṭabaqāt-i-Náṣirí, and does not use the word *bin*, but, that work not being written in the Túrání idiom, the *Kasrah* of *izāfat*, where necessary, is understood. The author of the Táǵ-ul-Ma'áṣir could not have had a good or an old copy of the "Ṭabaqát" seeing it was only written *thirty years* and more after that work. Neither has the Ṭabaqāt-i-Akbarí Arabic headings, Budá'úní says he copies from his patron's

\* Where is it so stated before I stated it?



work. I have already shown, in my notes 6 and 4 to pages 697 and 711, and in many other places of my Translation, what the Ṭabaḳát-i-Akbarí is. The Author in all probability *saw* the Ṭabaḳát-i-Náṣirí, but, as I suppose, he did not *take the trouble to collate* different copies, and contented himself with one—for example the I. O. L. MS. 1952, “a good old copy” too, which one person, at least, styles an “autograph”—the short-comings of the Ṭabaḳát-i-Akbarí may be accounted for. Firishtah contains *nothing whatever*—not a *single event*—respecting the Turk Sultáns of the Mu'izzí and Shamsí dynasties, but what is contained in the Ṭabaḳát-i-Akbarí, even to the poetical quotations and the blunders also.

I do not *propose* to change the name of the “conqueror of Bengal”: I *do* more. I *do* change it, without the least hesitation, on the authority of the best extant copies of the text of the “Ṭabaḳát,” which work, as Mr. Blochmann most correctly observes, “*is the only authority we possess for this period,*” and it will require positive proof to the contrary to make me give up the point. Because a name has been written incorrectly before, on wrong assumption, or on mere theories, and because the two names Muḥammad and Bakht-yár have been handed down and repeated from one writer to another as that of *one* man only, is there any reason why such error should be obstinately stuck to through thick and thin?

But at the same time I must state that I have naught to gain or lose by the change: I have no object in changing it, and only do so on the “undoubted authority” of my author. The matter lies in a nut-shell: either the father *was called* Bakht-yár, or he was *not*. If he was so called, then *he* has hitherto had the credit for *what his son* performed.

As to Muḥammad with the *kasrah* of *izáfat* being correct, I fancy Mr. Blochmann, even in a Muḥammadan “School Register,” [a great authority certainly,] never found one person called Muḥammad Maḥmúd without the last referred to his father—certainly not if a Musalmán in his senses wrote it down. But with regard to the “conqueror’s” name, *i. e.* Muḥammad, and Bakht-yár, that is Bakht-yár-ud-Dín, his father’s name, the word *bin*—son of—I first noticed in the oldest British Museum copy, one of the three best I have had for my translation, and Professor Rieu, on whose words, opinion, and experience in such matters, I place implicit confidence, considers it a MS. of the 14th century, or about a century after the time that Minháj-ud-Dín wrote. The word *bin* also occurs in the other British Museum MS., and in the best St. Petersburg copy, which is another of the three I refer to, and in the very old copy I have—which apparently looks, but may not be, much older than either of the other two—the whole of the headings are pointed, and in this last MS. the word *bin* does not occur, for at this particular place, as well as in a few other instances where *bin*, as in the case of Muḥammad *bin* Súrí, of whom more anon, *is* subsequently given, the *bin* has clearly been left out, accidentally, by the copyist.



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 341

The word *bin*—Mr. Blochmann's "solitary *bin*"—also occurs in the best Paris copy. So *bin*—"son of"—occurs in four MSS. : in three of the best and oldest copies ; the *izáfat* in a fourth *which often uses the izáfat for BIN in other instances where son of is undoubtedly meant* ; and *bin* in a fifth considered to be a precious "autograph" of the author's. In the other MSS. vowel-points are not marked, but the *izáfat* is, without doubt, meant there, as in other places where not marked. The "one or two authors" seems to be disapproved of—I had an object in not stating all my authors' names at the time.

I can give hundreds of such like instances of *bin* and an *izáfat* being used indiscriminately. But just look at the Calcutta Printed Text for example—the first page that meets the eye—page ۴۴ 44, the heading is "Al Amír Muḥammad, *bin* 'Abbás," and immediately under, second line, are the words:—*بامير محمد عباس سپرد* \* \* \* \* \* *ممالك غور* and, as rendered in my version, page 332, "He made over the kingdom of Ghúr to Amír Muḥammad-*i*-Abbás," and which Mr. Blochmann, according to his theory, would have written "Amír Muhammad 'Abbas," and so have made *one person of the plural*. There is another good example at pages ۱۱۴ and ۲۱۵ viz.:—*غياث الدين محمود بن محمد سام*—Ghiyás-ud-Dín, Maḥmúd *bin* Muḥammad-*i*-Sám. Here *bin* is used for one person—the son, and an *izáfat* understood and required for another person—the father : there is no *izáfat* marked, but it *must* be used, because Muḥammad, his father, was not called Sám, but he was the son of Sám—that is Bahá-ud-Dín, Sám. Ghiyás-ud-Dín, Maḥmúd's father's name, is written in full in the headings with *bin*, but under, *غياث الدين محمد سام*—Ghiyás-ud-Dín, Muḥammad-*i*-Sám, and likewise his brother's, *معز الدين محمد سام*—Mu'izz-ud-Dín, Muḥammad-*i*-Sám, but, by the theory put forth in the "*Contributions*," and the system followed in the translation of the "*Aín-i-Akbarí*," they would both be turned into Sám which alone refers to their father, and not to them, as the headings as well as the text—including the printed text—most undoubtedly show, and many other examples are to be found in the work. The names in the headings are written in Arabic, in every copy, throughout the whole book, and in the body of the work, according to the Persian idiom, the *izáfat* for *bin* is understood, as is also the case with the name of Ikhtiyár-ud-Dín, Muḥammad, *bin* Bakht-yár-ud-Dín, the Khalj, and others.

Another matter tending to prove that Bakht-yár is the father's titular name, is the fact that the author of the *Tabakát-i-Akbarí*—one of those who must have had the old and correct MSS.—styles him, "Malik Muḥammad-*i*-Bakht-yár-ud-Dín." Muḥammad *could not possibly* be called Bakht-yár-ud-Dín, and Ikhtiyár-ud-Dín *too*.

The same author, by the bye, at the head of the chapter, styles the "conqueror" of Bengal IKHTIYÁR-UD-DÍN, MUHAMMAD, *only*. Why? Because he understood that Bakht-yár-ud-Dín was his father's name.



"Further," says Mr. Blochmann, "supposing *bin* to be correct, is it "not strange, nay totally un-Persian, to speak continually of Muhammad-*bin*-Bakhtyár, or Muhammad-*i*-Bakhtyár, instead of using the single name "of Muhammad? This would be Arabic usage. Thirdly, if Mahmúd were "the grandfather, it would have been extraordinary on the part of the author "to have left out the grandfather in the heading, and in the beginning of "the chapter, when Muhammad Bakhtyár's descent is spoken of, and merely "incidentally to mention it in connexion with the paternal uncle."

It certainly would be *un*-Persian to speak continually of Muḥammad-*bin* Bakht-yár, hence, after the Arabic heading, as in other places throughout the whole work of Minháj-ud-Dín, the Persian izáfat is understood. Scores of examples in the text also show that a man's single name, such for example as Muḥammad would be here, is unusual except in the case of some slaves whose fathers' names appear to have been unknown. So engrafted is the custom of using the father's name with the son's [but not the grandfather's], that in our Indian Courts we find *bin* and *walad* always used, and even in Bombay we find low-caste Hindús, Dehṛs, &c., styled, for example—"Lakhsman, *walad* Nursia," and "Pándú *bin* Santo," &c. A grandfather's name is very seldom put in the headings of the *Ṭabaqát-i Násirí*—it is not usual to do so. Had the paternal uncle's name occurred in a heading the word *bin* would have been written no doubt; but, as I have before noticed, did any person ever hear one man called Muḥammad Mahmúd? I know, however, that one of the sons of Mahmúd of Ghaznín is styled Muḥammad-*i*-Mahmúd, and that his uncles are styled, Naṣr-*i*-Sabuk-Tigín, and Yúsuf-*i*-Sabuk-Tigín respectively. What a nice thing for a translator to make one man of them!

"Lastly," writes Mr. Blochmann, "the use of the Izáfat, instead of "*bin* or *pisar* (son), is restricted to poetry, and does not occur in prose [see "note†, page 280]. I see therefore, no reason to change the name of the "conqueror of Bengal, as proposed by Major Raverty."

This is a matter of such vital importance that I must give two examples of what may be caused through a translator not knowing where to place the izáfat so much objected to, as never occurring in Persian *prose*, in place of *bin*, son of, and which is so "*un*-Persian."

A careful and conscientious writer like ELPHINSTONE says, in Book V, Chapter I, of his History of India, that "Mahommed-Cásim" invaded Sind; and, page after page, and paragraph after paragraph, it is said that "Cásim" did this, and "Cásim" did that, and that "the Mohametan arms ceased with the death of Cásim."

In ELLIOT also, Vol. I, page 138, the extract from the Chach-námah commences with the death of Ráe Dáhir "at the hands of Muhammad Kásim Sakifi." These names—for they are used as that of *one* person—



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 343

"Muhammad Kásim" occur in scores of places throughout the extract, but, at page 157 we also have "Imádu-d-dín Muhammad Kásim bin Abí 'Akil Sakifi.

Now "Cásim" or "Kásim" had nothing whatever to do with Sind or its conquest. He was *dead* before *his son*, Muhammad, was appointed by his uncle to lead the 'Arabs into Sind, and so the father, who was in his grave at the time, has had credit up to this moment, in our Histories of India, for what his son performed, in the same manner that Bakht-yár-ud-Dín, the Khalj, has had the credit for what his son, Ikhtiyár-ud-Dín, performed.

From Tabarí downwards, the name of the conqueror of Sind is 'Imád-ud-Dín, Muhammad, *son* of Kásim, *son* of Muhammad, *son* of Hakam, son of Abú-'Ukail, and Al-Biláduri, an extract from whose work is given in Elliot, says the same as Tabarí; but because the author of the Chach-Námah headed his Chapters in Persian instead of Arabic, the necessary *izáfat* was not recognized, and hence this lamentable error. Such is history.

Examples of this I have already given; but turn to page ۴۰—40 of the Calcutta Printed Text, which is the same as other copies in these instances, and the fourth line from the heading are these words محمود سبکتگین رسید *chún takht-i-Ghaznín ba Amír Mahmúd-i-Sabuk-Tagín rasíd*. Does Mr. Blochmann mean to assert that Sabuk-Tigín is not the father's name? So much for the random assertion that "the *izáfat* instead of *bin* or *pisar* [which last I have not used] is *restricted to poetry*, and *does not occur in prose*," and according to the foot-note that it "is rare in poetry, and poets do not like to use this *Izáfat*." If Mr. Blochmann met with the following in Indian History—شهاب الدوله هارون بغرا ایلک خان—I wonder what he would think of it: he would write it "Shihábuddaulah Hárún Bughrá Ilak Khán," and make one person of it. I, however, would read it—"Shiháb-ud-Daulah, Hárún-i-Bughrá-i-Ilak-Khán," because I know for certain that Hárún who is entitled Shiháb-ud-Daulah is the son of Bughrá, who is the son of the Ilak Khán, who is named Músá, who were Kháns of Máwar-un-Nahr of the Afrásiyábi dynasty.

Next, in the same foot-note,† page 280 of the *Contributions*," Mr. Blochmann says that "Minháj-i-Siráj" does not mean in prose, 'Minháj, the *son of Siráj*,' but Minháj who writes under the name of Siráj. That the "father's name was Siráj has nothing to do with it."

Mr. Blochmann would find it difficult to show me where he "writes under the name of Siráj." I suppose it will be allowed that that Author *knew his own name*, and his father's, and if that be allowed, he calls himself repeatedly Minháj-ud-Dín-i-Saráj, and he further says that his father was the Mauláná Saráj-ud-Dín, whose father was the Mauláná Minháj-ud-Dín, 'Ugmán, whose father was the Imám, 'Abd-ul-Khálík, the Júrjání. For



these reasons ABÚ-'UMR-I-'USMÁN, who is also called MINHÁJ-UD-DÍN, sometimes styles himself in his work—MINHÁJ-I-SARÁJ-I-MINHÁJ—referring to father and grandfather also. Here are two *izáfats*, and in prose too. See also note 7, page 727 of my Translation.

I have already shown Mr. Blochmann's theory of "artificial" *izáfats*, as he calls them, to be "un-Persian," but, to prove that another statement here made is likewise incorrect, I must prominently notice another *izáfát*. It refers to the article "*Who were the 'Patan' or 'Pathan' Sultáns of Dihli*"—the paper in the JOURNAL A. S. BENGAL, for 1875, page 31. Mr. Blochmann says in the same foot-note,† page 280, "*Contributions*," para. 2, "The form of the name of Muhammad-i-Súrí, on whose name Major Raverty has built a hypothesis, is doubtful for this *Izáfát*."

Mr. Blochmann, apparently, did not notice that the matter of the *kasrah* of *izáfát*, at page 31 of the JOURNAL, has reference *solely* to FIRISH-TAH and his translators. If he will take the trouble to refer to my Translation, page 316, and to the corresponding place, page ۳۸—38 of the Calcutta Printed Text, he will find the heading, SÚRÍ, son of MUHAMMAD, showing that here Súrí is itself a Ghúrí name. Then let him turn to page 320 of the Translation, and he will find the heading "MALIK MUHAMMAD *bin* SÚRÍ", but in the corresponding place in the printed text page ۴۰—40, merely ملك محمد سوري. If I chose to be guided by Mr. Blochmann's theory on that heading alone, and did not know that the *kasrah* of توميدفي or description was required, and was in any doubts respecting the persons I was writing about, I might have called him, as Mr. Blochmann would, Muhammad Súrí, as though the two names belonged to *one* man, and have turned *two* men into *one* accordingly. The printed text also mentions him as محمد سوري twice in the same page, but a third time, in the last line of that page, when speaking of Malik Muhammad having made over Ghúr to his *eldest* son, his name is given with his father's and grandfather's name—امير ابو علي بن محمد بن سوري viz.:—Amír Bú 'Alí, son of Muhammad, son of Súrí.

Look again at the following heading in the Printed Text—page ۴۱—41, and there it is again confirmed, and we have علي بن محمد بن سوري—Abú-'Alí, son of Muhammad, son of Súrí, but in the ninth line, the father is again called محمد سوري the *izáfát* being understood. The next heading also refers to Muhammad being Súrí's son, viz.:—'Abbás, son of Shís, son of Muhammad, son of Súrí.

If my long note on this subject, 7, page 321, had been read before taxing me with building up a doubtful "hypothesis," it might have been seen that in the Kitáb-i-Yamíní, the author of which was contemporary with this very Muhammad, son of Súrí, who it is pretended [merely because Dow and Briggs so rendered it and made a Pathán of him], was called



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 345

*Muhammad Súrí*, he is never once referred to as Muhammad but as *ابن سوري* the son of Súrí. The *Tárikh-i-Alfi*, *Faṣih-i*, *Jahán-Ará*, *Rauzat-uṣ-Ṣafá*, *Ḥabīb-us-Siyar*, *Mir'át-i-Jahán-Numá*, and *Muntakhab-ut-Tawárikh*, call him son of Súrí only; and in the account of Maḥmúd-i-Sabuk-Tigín's raid upon the Ghúris in the *Jámi'-ut-Tawárikh* he is also merely called son of Súrí: never Muhammad. The Bengal A. S. Library contains a copy [No. 14] of this work, and Mr. Blochmann can refer to it. He will find, if the portion copied for me has been correctly copied, that in the first two places this Ghúrián chief is called *شوری* Shúrí—a mistake of *ش* for *س* but, four or five lines from the end of the paragraph, he is styled *پسر شوری* *pisar-i-Shúrí*—that is the son of Shúrí, and it is clear that Rashíd-ud-Dín followed the *Kitáb-i-Yamíní* and styled him son of Súrí likewise, but that, in two instances, the copyist of that MS. No. 14, or the Calcutta *kátib*, left out the word *پسر* before the name, in the first two instances.

If the two words '*Alí Mardán alone*' mean '*Alí who was as valiant as many men*', and if *Muhammad Sherán alone* also mean *Muhammad who was equal to many Lions*, and his brother is also "equal to many Lions" [rather strange that both brothers should be so], whence come these five or six "artificial" words, since without artificial means being adopted, the words '*Alí Mardán*' are—'*Alí men*'—and *Muhammad Sherán*—*Muhammad Lions*? These words would, without the *kasrah* of description be much the same as *Sháh Jahán*—*King World*—referred to in what I have said on the *izáfat*, and which is a complete answer also to these questions. *Muhammadan* "School Registers" have nothing to do with it. The *Khalj* Turks of *Garmsír* did not keep any Registers.

As this answer to Mr. Blochmann's criticisms may fall under the notice of readers not acquainted with the *Irání* dialect of the Persian, and as he constantly refers me to his "*Áin*," I must point out how inconsistent he is himself about these *izáfats*—I do not think I can be taxed with inconsistency—and how often his *izáfats* are used when they are not required, and wanting when not used. These inconsistencies, which I take from his translation of the *Áin-i-Akbarí*, may be seen at a glance; he appears to have no fixed system:—"Mír Sharíf-i-Ámulí" requires the *izáfat* according to his theory, but, as Mír Sharíf was a native of Ámul, the *yá-i-nisbat* or of relation affixed to Ámul—*آملی*—i. e. of Ámul—as it is written in the MS. from which it is taken, was sufficient; as *Flirs*—Persia, *Fúrsí*—Persian or of Persia; and *Panj-áb*—*Panj-ábí*; *Afghán*, *Afghání*, &c. The same occurs in "*Shaikh Faríd-i-Bukharí*," which last word containing the *yá-i-nisbat* means, of *Bukhará*, or the *Bukharíán*. As is now stands it is "*Shaikh Faríd the Bukharí*." Again, in the words "*Aláuddín-i-Khiljí*," although, at the very first page of Part III. of the "*Contributions*" referred to, the word *Khiljí* is called an adjective.



In another place, I find, "A'zam Khán" vide *Khán-i-A'zam* [see example of *Izáfát* previously given], and we find "Khán-i-A'zam" accordingly, but *Mir-i-'Adl* [as I should write it] is not correct according to Mr. Blochmann's theory: it must be "*Mir 'Adl.*" For example, I will give a list of some of the titular names and patronymics, and Mr. Blochmann's *different ways* of writing them:—

"Chingiz Khán" in histories called "Qáán i Buzurg"; Çadr Jahán Muftí requires no *izáfát*, but "Muftí-i-Mamálik" does, and "Umará-i-Kibár" does; "KhánKhánán" and "Khánkhánán" requires none: "Khán-i-Kalán" does; and "Khán-i-A'zam" does; "Khán 'Álam Firúz-jang," "Nuçratjang" and "Khán Zamán" require none: "Rustam-i-Zamán," Túzuk-i-Jahángirí, and Farhang-i-Jahángirí do: but Bahár-i-Dánish from me would be a dangerous innovation too, and my "Sháh-i-Jahán" is dangerous and *un-Persian*, but "Malikah i Jahán" is not! "Açaf Khán 'Abdul Majíd" requires no *izáfát*, but *the same person* " 'Abdul Majíd-i-Açaf Khán" does; Sulaimán Kararání [by-the-bye, there is *no such name*] requires no *izáfát*, but, a little farther on, it requires to be written "Sulaimán-i-Kararání"! I could multiply these examples *ad infinitum*.

Burdan-kot may be due "north of Bagurá (Bogra) in Long. 89° 28', Lat. 25° 8' 25", close to Govindganj, on the Karataya River," but I fail to find it in the 119th Sheet of the Indian Atlas; but great changes must have taken place since Minháj-ud-Dín wrote, when "a river" flowed in front of *his* Burdan-kot, "of vast magnitude, the name of which is Bagmatí; and, *when it enters the country of Hindústán*, they style it, in the Hindúí dialect, Samund (ocean) and, in magnitude, breadth, and depth, it is three times more than the river Gang" [Translation, page 561], and the Karataya must therefore have grown "small by degrees and beautifully less."

I did not "*identify* Maksadah": My words [note 4, page 576] are "the Maxadabad *probably* of the old Maps," &c.

Mr. Blochmann at page 284 kindly recommends me to Mr. Thomas's "INITIAL COINAGE OF BENGAL," regarding the reigns of "Muhammad Bakhtyár's" immediate successors; but as I have the account of "Minháj-ud-Dín," "*the sole authority for the period*," and some others, I can dispense with it, and have already done so in my Translation.

I am very glad to find, however, that Mr. Thomas has met with the coins of Ikhtiyár-ud-Dín, DAULAT SHÁH-I-BALKÁ, the Khalj, mentioned in my Translation, page 626 and farther on, which has not appeared in the "*Contributions*," or doubts might probably have been thrown on his very existence as a ruler.



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 347

I am told that Sultán Firúz Sháh-i-Abú-l-Muzaffar, Sháh-i-Jahán, the Habashí, "has not been included" among the "Pathan" dynasties. He will be found in Dow and Briggs, and in the following, respecting some coins found in "Cooch Behar": "*Of the other Bengal Pathans* whose coins occur in this trove, I [Rájendralála Mitra] have to notice FIRUZ SHAH THE ABYSSINIAN." See *Bengal A. S. Journal*, 1864, page 481.

Page 285, of the "*Contributions*," Mr. Blochmann says regarding Jáj-nagar, "Major Raverty has come to the same conclusion as I had."

This is really too magnanimous on his part, and more than I can accept. I beg leave to state that I *had* come to the conclusion many years before I offered the Translation, of the Tabakát-i-Násirí to the Society: in fact, in 1865.

Mr. Blochmann will find Katásin by and bye: I shall have something to say about it hereafter.

Page 285, "*Contributions*," it is said, "Major Raverty's assertion that 'Lakhnautí' was called by the Emperor Humáyún 'Bakhtábád,' is untenable." If Mr. Blochmann thinks Bakhtábád is a copyist's error, he can satisfy himself, for, of course, he had seen and consulted the "*Khulácat uttawárikh*," which is "a modern work." It is an excellent one nevertheless in many ways. I found the two copies I consulted quite similar, and quoted it accordingly. Page 286 of "*Contributions*," we have "*As the borderland* to the west of Jáj-nagar Major Raverty mentions Garhá-Katanka, and then says (page 587) quoting the *Ma'dan-i-Akhhár-i-Ahmadi* that 'on the north it is close to the Bháṭah territory [the Bháṭi of the *Áin-i-Akbarí*], and, south, is close to the Dakhan.' "But this is an extraordinary confusion of names, partly due to the author of the *Ma'dan*, especially "if he wrote Bhāṭah with a long á. He means Bhāṭh, or Bhat-ghorá, the "mountainous tract south of Alláhábád, whilst Bháṭi is the name of the "Sundarban region along the Bay of Bengal," &c.

Mr. Blochmann has evidently not seen "the *Ma'dan*," but that Bháṭi is written, or rather *printed*, with a long á, is not due to "the *Ma'dan*" at all, but to "the *Áin*"—my MS. original I mean. The *Ma'dan* has بهنه but I, foolishly depending on my *Áin-i-Akbarí* as a better authority, put it in as I found it there بهاتی with ۱. So what is supposed to be an error of "the *Ma'dan's*" is really mine from being thus led astray. Whether Mr. Blochmann's *Áin* contains it I cannot say, but the *Áin* before me has بهاتی. I see nothing, even according to Mr. Blochmann, particularly wrong even in the *Jámi'-ut-Tawárikh*, although it is styled a "compilation without value," when we consider what natives write imagine regarding the cardinal points; and that work evidently refers to the Bháṭi Sundar-ban which was S. W. from the place, probably, where the author of it wrote.



Whether Bhaṭah, Bhāṭah, Bhaṭī, or Bhāṭī, with long or short *a*, it comes from the same original. In the Aín translation it is said: "Abul-fazl gives this spelling in the 'Akbar-námah,' and says it means *lowland* from the Hindústání بهاتی, *down the river*." The word is written in Hindi بهاتی and بهتی.

As to the "stone" wall in the same paragraph of the "*Contributions*," referring to note page 595 of my Translation, I mentioned that "I am not *personally* acquainted with Bengal," but my Aín's words respecting it are as follows:—

در سرکار منگیر از دریای کنک تا کوه سنکین دیواری کشیده اند

I wonder how any one would read that, the *hamzah*—ء—expressing the izáfat being added to کوه even according to the "Túrání" idiom? To express what Mr. Blochmann says of the stone wall, I should have expected to have found it written سنکین دیواری کشیده اند از دریای کنک تا کوه and then there could be no possible mistake even for a copyist to make in MS.

In a foot-note to page 286 also it is said: "Major Raverty mentions [it should have *added* what *I really did* say at page 592] the Afghán Zamíndár of Bír-bhúm and *Ját-nagar*—the italics, I daresay, imply a reference to Jáj-nagar," &c.—I daresay they imply nothing of the sort; and the previous *twenty-six* paragraphs on Jáj-nagar, extending over *six pages*, will show, to any ordinary eye, where I consider Jáj-nagar to be.

Persons not absolutely acquainted with a locality may at 6000 miles' distance, in the extreme west of England, and not having the staff of a *Madrasah* at command, and *on the spot*, be involved in error by a clerical mistake in a MS., and in proof of this and show that he is not immaculate, I will give a single instance out of many in Mr. Blochmann's own Aín Translation, quoting the Ma'áşir-ul-Umará, although he is *in* India.

Page 422, vol. i. :—"Regarding the town of Bhakkar, Abulfazl says that it is called in old books Mançúrah. *Six rivers* united pass by it in *several branches* (sic); two branches lie to the south, *one* to the north. The town *at the latter branch*, is called Bhakkar. On the second branch another town lies, called Loharí, and *near it is the Indus*."

So, according to this, "Bhakkar" and "Loharí" are not *on the Indus*, but *near it*!

The following is, literally, what the Ma'áşir-ul-Umará, says:—"Bhakar is the name of a fort among the erections of former times—in old books they write it Manşúrah—and all the *six* northern rivers [*i. e.* the Indus and the Panj-áb], having become one, pass by it—one portion passing on the southern side, and one part on the northern. The *kaşbahs* named Sakhar—سکر—a town on one bank of the river, and another town, known as



1876.] H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* 349

Lhorí,—لہوری—on the other side [Sindhís often substitute *r* for *l*] were always included in Sind. Mírzá Sháh Husain, the Arghún, entirely rebuilt it [Bhakar] of exceeding great strength, and made it over to Sultán Muḥammad-i-Kokal-Tásh."

This is perfectly intelligible to any one who has seen Sakhar, Bhakar, and Rohrí, or looked at a map only. Notwithstanding the "learned" Abú-l-Fazl, however, Manṣúrah was a totally different place to Bhakar, and some 200 miles farther down the river. See page 540 of my Translation, and note, last para. of that page.

With reference to what is called ["*Contributions*," page 279,] my "dangerous innovations" in spelling names, which in reality means that everything is innovating which may be contrary to Mr. Blochmann's system, I foresaw, at the outset, that we should not agree in this matter, we having, it appears, peculiar ideas on this point. Such Bengal names as are derived from the Sanscrit may, in some instances, be not quite correct: I have written them as my Persian authorities write them, and from my system of transliteration—the Jonesian system—the original letters may be known. In some few places "the printer's devil" has left his mark upon them [as he has in my Paper on "*the Pathán Dynasties*," with a vengeance], and Mr. Blochmann was in such a hurry that he did not wait for the list of errata to my Translation, but thought he had made a discovery. For example: the word Aṣif is an error for Aṣaf; Bikrámpúr for Bikrampúr, Jessore for Jellasure, and Dínjápúr for Dínájpúr. The last will be found correctly at page 559.

As to the rest, referred to in note † of the same page of the "*Contributions*," I do not agree as to the word Sálár being part of the name: it refers to a chief—*Sipah-Sálár* may be a proper name after the same fashion. In ELLIOT [page 315, vol. ii.] the man's title and name are actually translated "*victorious general*." I shall expect with some curiosity Mr. Blochmann's strictures or otherwise on this translation of "*Minháj-us-Siráj*." ظفر — Zafar—means *victory*—so it would be *Sálár victory*—chief victory—if translated. Arabic words—active participles in particular—are used as Musalmán names and titles, but it is new to find the noun Zafar—victory—used for the purpose.

Minháj-ud-Dín, and a score of others write Kálbí—it is used as well as Kálpí. In Lexicons words beginning with ب *b* and پ *p*, will be both found under the letter *b*.

Kuhrám—is spelt thus کھرام with *Káf-i-Túzi* and *rá-i-Hindí* in a geographical account of the upper provinces from Dihlí to the Indus, and from thence to Sindh, Kandahár, and all round to Ladákh, and the Antarbéd Do-áb, which I should have published but for the years I have given to the Ṭabaḳát-i-Náshiri. Elliot also spells it with *k*, not *g*.



350 H. G. Raverty—*Reply to 'Histy. and Geogr. of Bengal, No. III.'* [No. 3,

Budá'ún is spelt بُدَاوُن and also بُدَاوُن\* Budán'ún, the first *n* being nasal; Sursutí—سُرسُتِي; Síwastán—سِيوَسْتَان, and also Shíwastán, from Sanskrit शिव, a Hindú deity; Jamádi جمادي is written in the Irání idiom: sometimes Jamádá; 'Arif—عارِف, 'Arifain—عَارِفَيْن; Tazkirah or Tazkarah, both are correct; Shajr and Shijr both signify a tree in Arabic, hence Shajarah or Shijarah may be used; Saráj, which I have also met with spelt *Siráj*, signifies a lamp, luminary, or the sun, hence Saráj-ud-Dín, the father, means "the Luminary of the Faith," as his son's name, Minháj-ud-Dín signifies "the Highway or Road of the Faith"; Waná-Gangá—وَنَاگَنگَا; Gúdáwuri [ask a Madrasi how he pronounces it]—گوداوری; Rásín—راسین; Chhotah Nág-púr چھوٹہ ناگپور; Jhár Kundah جہاز کندہ and جہاز کندہ [signifying bushy, a forest, the forest of Baijnáth] and is also written in some of the works quoted in my Translation with چ جہاز کندہ; and Karmah-násah is written کرم ناسہ and Karam-Násá کرم ناسا.

The Haft-Iklím of Mr. Blochmann may be different, but my copies of that "excellent work" have precisely what I have given at page 593. As to when the author finished his work, or where he got his Hindí 3 from, may be seen from that work. Perhaps Mr. Blochmann will examine one. Possibly he may have seen a small letter ط written over letters, which are intended to express ث 3 3.

The word پايان, as any Dictionary will show, means "depression," "lowliness," "inferiority," as well as "end" and "extremity."

Arkhnák is "the printer's devil's" work for Arkhánk, also written رخنكى—Rakhang—anglicized Arracan.

I have lived too long in the DAKHAN ever to write it Dak'hin, and I have never written it *Dak'han*; neither could I think of writing Abú Bakr where Abú Bikt is meant.

Mr. Blochmann taxes me with making "dangerous innovations" in spelling proper and geographical names, but he has a peculiar method of his own, and I must point some of them out. I take them merely from the first volume of his Translation of the *Áin-i-Akbarí*, to which he so often refers me:—

"Mullá *Mubárik*," also "Qutbuddín *Mubárik* Sháh" and "Shaikh *Mubárik*," even on the covers, for Shaikh Mubárah, Mullá Mubárah, &c. "Rahtás" instead of Rohtás; "Pasháwar", instead of Pesháwar [پشاور is written in Pushto with its peculiar ك' or س'." "Harát" for Hirát [It

\* Major Raverty's original has *sukúns* above the *dál*, the medial and the final *nún*. Lower down, in 'arífain, the *sukúns* stand above the *fe* and the *nún*. Types with fixed diacritical marks are not to be had here.—ED.



may have been supposed that, as Harí was the ancient name, natives of it styled Harawí, and that the river is still the Harí river, "Harát" must be right]; "Darogah" for Dárogah; "Farmili" for Farmuli; "Zúl-nún" for Zú-u-Nún [Jonas]; "Zúzan," for Zozan or Zauzan; "Jhelam" [whence the *e*?], for Jhilam; "Sodharah," for Súdhará; "Shujá" for Shuja; "Bhambar," for Bhimbar; "Bigrám," for Bagráma; "Pak'hali" for Pakhlí or Paklí; "Qárlyghs," as the transliteration of قارلوق—Kárlúgh; "Bhírah and Khusháb," for Bharah and Khúsháb; "Sewe," for Siwí; "Baloch," for Balúch; "Duáb," for Do-áb or Do-ábah; "Chanáb," for Chináb; "Sukkhar" and "Suk'har opposite Bhakkar," for Sakhar and Bhakar or Bhakhar; "Qanauj," for Kinnauj; "Gálnah," for Jálnah; "Guhram," for Kuhram; "Tiranbak," for Trimbak and Trinbak; "Qalát," for Kalát; "Sahwán," for Sihwán; "Dará Shikoh," for Dará Shukoh; "Qoran" and "Qorán," for Kur'án; "Kázarún," for Kázirún; "Sulaimán Kararání" and "Sulaimán i Kararání," in several places, for Sulimán, the Karání: ["Kararání" is an impossible name]; "Músá Razá," for Músá-i-Rizá [*i. e.* the son of Músá-ul-Kázim, the Imám]; "Khattar," for Khat-har [کھتر]; "Dilahzák," for Dilazák; "Raushánís, who like other Afghán tribes," &c., there being no such Afghán tribe whatever; "Khán Jahán Lodhí," for Khán-i-Jahán, Lodí; "District of Mount Teráh," for Hill tract of Tírah: "Táiqán" for Táekán.

The system of writing 'Arabic words is after the same uncertain fashion:—at one time, "Makhdúm-ul-Mulk," at another, "Makhdúm ulmulk;" "Mui'zzulmulk" at one time: "Mu'izz-ul-Mulk", and "Mu'izz-ul Mulk" another; "Zakhírat ulkhawánín" at one time, "Zakhiratul-khawánín," another; "Çimçám uddaulah," for Şamşam-ud-Daulah\*; "Abú-jahl," for Abú-Jhal\*; "Rauzatuççafá," for Rauzat-uş-Safá, and the like.

Some 'Arabic titular names and patronymies require the 'Arabic *Ul* to give them sense, such as "Mihrunnisá," for Mihr-un-Nisá, and "'Abd-ul Majíd" for 'Abd-ul-Majíd, but with other words, used according to the Persian idiom, which require an equivalent to this *Ul* in the shape of the *kasrah* of description the *izáfat* is wrong, "dangerous," "un-Persian", and must be "Núr Jahán", "Núr Mahall", like Sháh Jahán, which mean, respectively, thus written, "Light-world," "Light-palace or house," and, "King-World," instead of Núr-i-Jahán—The Light of the World; Núr-i-Mahall—The Light of the Palace or House; Sháh-i-Jahán—The King of the World; and yet, when he comes to translate them, Mr. Blochmann adds these "artificial" *izáfats* to get the *the* and *of the*, as in "Çadr Jahán"—Muftí *of the* empire; and "'Abdurrahím Khárf"—Abdurrahim *the* Ass, &c.

\* Thus in printed original. Ed.

† The long á in Major Raverty's printed original. Ed.



In concluding these remarks I think what I have here given is sufficient reason for my saying that, in the matter of *izāfats*, and system of spelling proper and geographical names, I shall never follow Mr. Blochmann.

*Note.*—The above article has been inserted at the urgent request of Major Raverty. As he has now stated his views on Persian Grammar, &c., and Mr. Blochmann does not think it necessary to write a 'Rejoinder', the subject has come to a close. ED.

*Morals of Kālidāsa.*—By PRANNĀTH PAṆḌIT, M. A.

It has been remarked by a great philosopher that the conception of man as the chief of the economy of nature is a stimulus to the cultivation of the noble qualities, which place him at the head of the living hierarchy. There can be, he observes, no danger of apathy in a position like this,—with the genuine and just pride of such pre-eminence stirring within us; and above us the type of perfection, below which we must remain, but which will ever be inviting us upwards.\* Viewed in this light, it may not be uninteresting to investigate the moral type which the greatest of Indian poets held up for imitation to his contemporaries, men within whom there stirred not only the pride of being placed at the head of the living hierarchy, but that of being the highest development of the human race.

The four divisions of Morality which I have adopted in this paper are the following:

- I. Individual.
- II. Domestic.
- III. Social.
- IV. Military and Political.

And I may here mention once for all, that neither in the principles, nor in the details of classification, do I pretend any claims to originality.

**INDIVIDUAL MORALITY. Self-conservation.**—In the first great subdivision of Individual Morality, namely, self-conservation, Kālidāsa does not fail us. He tells us of *Dilīpa* that he guarded himself, though not through fear† to which the advice of the disguised *Shiva* that the body is the first requisite for religious works‡ may serve as a commentary. *Nandini* advises the same king to preserve his body, the enjoyer of continuous hap-

\* Comte's Positive Philosophy, translated by H. Martineau, Vol. II, p. 554.

† जुगोपात्मानमवशः । Raghu., I. 21.

‡ शरीरमाद्यं बहु धर्मसाधनम् । Kumāra Sambhava, V. 33.



piness\* and the disciple of the sage *Varatantu* eloquently exposes to *Aja* the futility of killing himself through grief for his Queen.†

**Maiming.**—Recognising the justifiableness of maiming a member for the preservation of the whole, Kálidása has adduced the example of a snake-bitten finger, which though otherwise so dear, must be excised.‡

**Sati.**—In the case of *Sati*§ the individual duty of self-preservation is subordinated to the higher duty of conjugal fidelity, and it cannot be urged as a reproach against our poet, that he was one-sided in his conceptions. Whatever might be the popular practice, Kálidása|| could conceive of a husband's immolating himself on the funeral pyre of his beloved wife, or deterred from that by exterior considerations, killing himself deliberately in some manner more orthodox. In the case of the disconsolate consort of the God of Love, the final catastrophe is avoided,¶ without any detriment to her conjugal fidelity, by the intervention of a voice from the sky which bids her desist, as her husband would at last be restored to life.

**Suicide.**—Mallinatha\*\* feels himself bound to justify the apparent immorality of the suicide of the blind parents of the boy whom Dasharatha had unwittingly dealt a death-wound, and he does so on the ground of a text which permits decrepit *Vánaprasthas*, when no longer able to perform sacrificial rites, to put an end to their existence by falling from a precipice, burning in fire, or drowning in water. The suicide of Rama may†† be explained on two theories. Firstly, the obligation that the poet was under, of not falsifying such a cardinal point in the traditional history; and secondly, the incompatibility of the conception of death by disease or old age, with that of an incarnation of the Supreme Deity.

**Health.**—Early rising is one of the best means of preserving our health, and this Kálidása predicated of his heroes, though he has said nothing about the general duty of preserving our health. The princes of the solar race are very regular about the hour that they left their beds,‡‡

\* तद्रच कल्याणपरम्पराणाम् भोक्तारमूर्जखलमात्मदेहम् । Raghu., II. 50.

† Raghu., VIII. 83—90.

‡ त्याज्यो दुष्टः प्रियोऽप्यासीदङ्गुलीवोरगचता । Raghu., I. 28.

§ Raghu., XVII. 6.

|| Raghu., VIII. 72, 94, 95.

¶ Kumára Sambhava, IV. 39-45.

\*\* Comm. on Raghu., IX. 81. न चावात्मघातदोषः । अनुष्ठानासमर्थस्य वानप्रस्थस्य जीर्यतः । भस्मपि जलसङ्घातैर्मरणं प्रविधीयत इत्युक्तेः ।

†† Raghu., XV. 103.

‡‡ यथाकालप्रबोधिनाम् । Raghu., I. 6.



and this is exemplified in the case of Aja.\* One of the reasons that led the sage councillors of Dasharatha to approve of his hunting expedition is its bracing effects on the constitution.† The Messenger Cloud is requested to rest his wearied feet and quench his thirst on the lofty mountains and in the cooling rills which abound in his path,‡ and the request to rest himself is repeated further on.§

**Wealth.**—The duty of accumulation of wealth flows from that of preserving our health, as wealth accumulated is but energy conserved. It was not lost sight of by Kálidása. He puts into the mouth of one of his characters the reflection that even a thirsty *Chátaka* cares not to solicit rain of the autumnal cloud whose aquatic stores have been drained to the dregs.|| But knowing withal how to guard against its degenerating into a selfish miserliness, he subordinated it to the higher moral duty of benevolence. As he himself tells us, the good, like the clouds, take but to give.¶ The princes of the solar race, accumulated treasures, in order to be able to give them away,\*\* and of *Dilípa* we are told that he amassed wealth though devoid of avarice.†† Of another king, Atithi, we are told that he collected treasure only because that lies at the root of patronage, as the *Chátakas* greet only the cloud that carries a store of water in its bosom.‡‡ To use the language of the Meghaduta :

“ Of all the fruits that fortune yields, the best  
“ Is still the power to succour the distressed. §§ ”

**Humility.**—Humility lies at the root of self-culture, the second subdivision of Individual Morality, for surely, ere one labours for self-improvement, he must be impressed with a sense of his own shortcomings. Kálidása never grudged humility. He begins his *Raghuvansa* with the following confession :

“ How men will mock the humble bard who sings  
“ The ancient glories of sun-born kings ;

\* Ragh., V. 65.

† अमञ्जयात्प्रमुखाच्च करोत्यसौ तनुमतोऽनुमतः सचिवैर्यथै ॥ Ragh., IX. 49.

‡ Purva Megha., 13.

§ Purva Megha., 27. 53.

|| निर्गेलिताम्युग्मं, शरद्वनं नाहंति चातकोऽपि। Ragh., V. 17.

¶ आदानं हि विसर्गाय सतां वारिमुचामिव । Ragh., IV. 86.

\*\* त्यागाय सम्भृतार्थानाम् । Ragh., I. 7.

†† द्रष्टव्यराददे सोऽर्थम् । Ragh., I. 21.

‡‡ Ragh., XVII. 60.

§§ आपन्नार्तिप्रशमनफलाः सम्पदे क्षुत्तमानाम् । Purva Megha., 64.



" Like a young child with little hands outspread

" For fruit that glows above a giant's head.\*"

Raghu, he informs us, appropriated the wealth of the Kámbojas, but not their pride.† The education of Ráma and his brothers only increased their natural modesty, as oblations of clarified butter magnify the sacrificial fire.‡ Shatrughna bends his head in humility when the holy sages congratulate him on his prowess in killing the demon Lavana.§ Youth, beauty, and prosperity are each of them fountains of pride, but still the king Atithi was humble of mind.|| The same monarch was abashed when the praises which he justly deserved, were uttered before him.¶ Another king *Páriyátra* shared the same virtue.\*\* *Purúravá*, when complimented by the king of *Gandharbas* on his valour in rescuing the nymph *Urcasi* from the profane hands of a vile demon, and thanked in *Indra's* name for the same, modestly disclaims all personal merit :

*Pur.* You rate the deed too high. Not mine the glory,  
But his, the Thunderer's, from whom derived  
The strength of those who conquer in his cause.  
The very echo of the lion's roar,  
As through the rocky rifts it spreads and deepens,  
Appals the mighty elephant.††

Justly might *Chitraratha* exclaim :

'Tis well.

This modesty becomes your worth. Humility  
Is ever found the ornament of valour.‡‡

**Self-control.**—The third sub-division of Individual morality is self-control, or the subjection of passion to reason. Kálidása rightly conceived that self-control has a moral value only when it has some temptation to overcome. He reconciles the apparent inconsistency of *Shiva's* behaviour in approving of *Umá's* ministering to his wants, such as they were, whilst engaged in the performance of severe austerities, by the reflection that they indeed are the really firm-minded whose equanimity is not disturbed in the presence of a disturbing cause. §§

\* Raghu., I. 3.

† Raghu., IV. 70.

‡ Raghu., X. 79.

§ Raghu., XV. 27.

|| Raghu., XVII. 43.

¶ कूयमानः स जिज्ञाय क्षुत्यमेव समाचरेत् । Raghu. XVII. 73.

\*\* Raghu., XVIII. 17.

†† Vicramorvaashi, Act I. Wilson's Hindu Theatre, Vol. I., p. 204.

‡‡ युक्तम् । अनुत्तुकता खलु विक्रमालङ्कारः । Vicramorvaashi, Act I.

§§ Kumára Sambhava, I. 59.



**The sexual appetite.**—Kālidāsa subordinated the strongest animal appetite to the religious duty of procreating progeny. The princes of the solar race, and *Dilīpa* in particular, marry but to have progeny.\* The untimely death of *Agnivarna*† points the moral of a course of abandoned licentiousness to which many an Indian prince has fallen a victim. *Dasharatha* had sufficient strength of mind, to withstand such allurements. No passion for the chase, no fondness for dice, nor moon-begemmed goblets, nor the charms of maidens in the bloom of youth, could allure him from the paths of ambition.‡

**Temper.**—Kālidāsa's sages have sufficient control over their temper, to modify the effects of their curses, when the impertinent victims of rage, too often mere instruments in the hands of their masters, craved for mercy,§ as *Priyamvadā* remarks, water is naturally cold, it is but the communicated heat of fire that makes it momentarily warm.||

The most remarkable case of self-control, however, is to be found in the beginning of the *Raghuvansa*, and fully to appreciate it, a little detail is necessary. *Dilīpa*, king of men, blessing and blessed in his loyal and contented subjects, at peace with his vanquished foes, and ruling the earth—

Like one vast city girdled by the sea,¶  
is sad at heart since his lovely queen has borne him no son. He feels most keenly that the load of debt which he owes to his ancestors, remains yet undischarged. The idea is painful that after him there will be none to present the ancestral oblations, none to continue the lineage. He repairs with his consort to his family-preceptor, the sage *Vashishttha*, who by holy meditation arrives at the cause of the king's misfortune. At a "thoughtless moment", he had omitted to pay due respect to the divine cow *Surabhi*, and had been punished in the very object that had caused the fatal omission. As an atonement, he is directed to propitiate her daughter, *Nandini*, by tending her most faithfully through thick and through thin. For three weeks he plied this arduous task, sitting when she stopped, rising when she moved, desiring water only when she had allayed her thirst—pursuing her as her shadow. The next day when he had followed her to fresh fields and

\* प्रजायै गृहमेधिनाम् । Ragh., I. 7. परिणेतुः प्रसूतये । Ragh., I. 25.

† Ragh., XIX. 48—54.

‡ Ragh., IX. 7.

§ Ragh., V. 53. 54. VIII. 79, 80, 81.

|| उष्णत्वमग्न्यातपसस्त्रयोमात् भैत्यं हि यत् सा प्रकृतिर्जलस्य ॥ Ragh., V. 54.

¶ Griffith.



pastures new, amidst the glens of the Himálaya, and when, confident in his mind that the fiercest beasts of prey could not even entertain an idea of attacking her, he was admiring the majestic scenery around, a lion, unseen, pounces upon *Nandini*. The moan of the victim attracts his attention and his right hand is at once to his quiver. But, wonder of wonders! it is paralysed as soon as it touches the feathered tip of an arrow. Astounded at this strange occurrence, the king burns with his own fury as a serpent whose energy has been restrained by charmed drugs. The Royal beast then, in human language, makes himself known as one of *Shiva's* attendants who had been made to assume the leonine shape for the purpose of scaring away wild elephants from certain trees which were *Párvatī's* pets. To ensure the most perfect vigilance, his food was restricted to such animals as might stray into his grasp. The cow therefore was his lawful and pre-ordained prey. *Dilípa* is therefore advised to return to the hermitage, unabashed, as he had tried to do his best in the matter, and there was no help for it.

This speech gave *Dilípa* at least one consolation, namely, that he owed his discomfiture in arms to the majesty of *Shiva* and not to any inferior agency. But to leave his precious trust to her fate, was out of the question. He therefore attempts a compromise by offering himself as a substitute for *Nandini*. The Beast laughs at his foolishness and appeals both to his Self-love and his Benevolence, to preserve himself and let the cow meet her fate. The undisputed sovereignty of the whole earth, the bloom of youth, and such handsome limbs were too much to be sacrificed for an insignificant quadruped. His death would liberate the cow, but plunge into the depths of misery the thousands who flourished under his fatherly protection. Nor was there any thing to be apprehended from the anger of the sage, which might easily be appeased by the present of myriads of stout milk-bearing cattle.

The monarch, however, is unconvinced, despite all this convenient philosophy. He feels that death would be better than belying his Kshatriya protectorate of wrongs. Nor was the cow any ordinary one, but inferior to *Surabhi* only, and but for the prowess of *Shiva*, would have proved a tough morsel for the leonine palate. The loss therefore could not be made good by any number of substitutes. He concludes by adjuring the Lion to take pity not on his terrestrial form, but on his यशः शरीरः, his body of fame. The Lion thereupon leaves hold of the cow, and the king offers himself up as a ball of meat before him. At this supreme crisis, when, with down-cast eyes, he was expecting every moment the infuriated beast to fall on his back, and with famished paws to tear him open from limb to limb, a shower of flowers falls from the sky, and the nectareous words float to his ear, 'Rise, Son!' He rises to see only the cow



standing before him as an affectionate mother. The whole was an illusion called up by *Nandini* to test the sincerity of *Dilípa's* devotion, and pleased with the result of the ordeal, she asks him to mention any boon, and, as might be expected, he asks for a son, the founder of a race. *Nandini* thereupon directs him to improvise a goblet of leaves and quaff her milk. He had at last attained the goal of his long-cherished desires. After toil, danger, and sacrifice, the prize lay within his grasp. What does he do? He informs her most respectfully that he would rather postpone the consummation till her calf had been satisfied, the quantity sufficient for sacrificial purposes obtained, and the permission of the sage accorded. This is perhaps as high an ideal of self-control as may well be imagined.\*

**DOMESTIC MORALITY. Sexual Morality, Love.**—The ultimate molecule of society is not the monad man, but the dual couple. Sexual morality, or the duties of the conjugal relation, comprise therefore the first division of Domestic Morality. The union begins in love, and of that we may be sure of having an abundant supply in the works of Kálidása. Indeed wiseacres have been heard to exclaim what else of morality could be expected in them. From the tender regard of *Dilípa* for his royal spouse† to the famished looks with which the latter drinks in the countenance of her husband when returning from the forest where he tended *Nandini*‡; from the eloquent madness of *Pururavá* to the feeling delusion of the exiled *Yaksha*; from the heart-rending dirge of *Aja* for his beloved *Indumati*, which makes even the trees shed their tears of nectar,§ to the equally moving lament of *Rati* for her incinerated *Kandarpa*, which attracts the sympathy of the forest,|| there is ample room and space enough to satisfy the most fastidious ideal of conjugal love. When *Rati* laments the indelible stain which would attach to her for ever, that she had survived her Cupid even for a moment, stain that not even the self-ignited flames of a *Sati's* pyre would cleanse,¶ and when *Sítá* reproaches herself with having survived the illusion of *Ráma's* decapitated head, which the malignant ingenuity of *Rávana* had conjured up, after she had once believed it to have been true,\*\* there is a poesy of love that would bear comparison with anything that has been written in different climes or distant ages.

\* *Raghu.*, I. 12—95. II. 1—66.

† *Raghu.*, I. 54. II. 3.

‡ *Raghu.*, II. 19.

§ *Raghu.*, VIII. 44—70.

|| *Kumára Sambhava*, IV. 4—38.

¶ *Kumára Sambhava*, IV. 21.

\*\* *Raghu.*, XII. 74, 75.



**Fidelity.**—The moral value of the system of marriage, as has been justly observed, lies in the discipline to which it puts the strongest instinct in our animal nature, while at the same time satisfying it. To reap the full effects of this moral discipline, conjugal love must be not only strong but constant. *Aja* never marries after the tragic death of his beloved *Indumati*.<sup>\*</sup> When the fair sister of *Rávana* makes a delicate proposal to *Ráma*, the latter pleads as an excuse that he is married.<sup>†</sup> When the clamor of the populace compelled him to send into exile his beloved *Sítá*, he could not exile her from his heart.<sup>‡</sup> *Ráma* is a staunch monogamist at heart, and when the ordinances of religion made it imperative, that he should have a partner by his side when performing sacrificial rites, his only companion was a golden image of the exiled *Sítá*.<sup>§</sup> His son, *Kusa*, who trod in his footsteps, proudly assures a female apparition that had mysteriously found access to his chamber at dead of night, that the well-governed minds of *Raghu's* race have no predilection for the wives of others.||

**Polygamy.**—This brings us to the kindred subject of Polygamy. That this practice was prevalent among the kings and the aristocracy will not admit of dispute, and perhaps the greater fidelity to nature expected of a dramatist may account for its mention in the dramas. But it is noteworthy that it is never prominently brought forward in the poems, except in the case of the wives of *Dasaratha*. These are only three in number, and not ten thousand. The fact was one too prominent to be safely suppressed and indispensable to the plot of the story, and indeed it may be pleaded as an excuse that the tragic end of the monarch, and the exile of his eldest son, illustrate very well the evil effects of Polygamy. The greatest of our poet's heroes are either monogamists or may be taken to be so for all the purposes of his epic narrative. 'Mayest thou gain the *undivided* love of thy husband'¶ is the blessing that is pronounced over *Umá* when her bridal toilette is finished, and throughout the seven cantos of the *Kumára Sambhava* there is no mention of the co-wifehood of *Gangá*, though that was well-known to Kálidása.\*\*

**Obedience.**—"The natural subordination of the woman, which has reappeared under all forms of marriage"†† finds expression in the conjugal

\* *Raghu.*, VIII. 92—95.

† *Raghu.*, XII. 34.

‡ *Raghu.*, XIV. 84.

§ *Raghu.*, XIV. 87. XV. 61.

|| अचल मत्वा वशिनां रघूणां मनः परस्त्रीविमुखप्रवृत्तिः । *Raghu.* XVI. 8.

¶ अखण्डितं प्रेम लभस्व पत्युः । *Kumára Sambhava*, VII. 28.

\*\* *Purvamegha*, 51.

†† *Comte's Positive Philosophy*, Vol. II., p. 135.



duty of obedience, of which examples are not wanting in the poems of Kálidása. *Sudakshinā*, advanced in pregnancy, greets her lord by rising from her seat, although it cost her an effort to do so.\* *Vishṇu* reclines in the Ocean of milk, on his Serpent-bed, with his feet resting on the gentle lap of *Lakshmi*.† *Menakā*, queen of the mountain-king, has no objection to give away *Umā* in marriage to *Shiva*, as devoted wives never take exception to the wishes of the husband.‡ At the nuptial rites the officiating priest solemnly preaches to *Umā* implicit obedience as the rule of married life.§ History or Romance will afford but few parallels to the resignation with which *Sítā* bore her mandate of exile. She said nothing harsh against her husband, who had cast her away for no fault of her own, but only reproached *herself*, because so much misery argued misbehaviour in a previous existence. She gladly absolves *Lakshmaṇa* from all blame, as he has only implicitly carried into effect the mandates of his elder. A momentary doubt hangs over her mind, whether scripture or ancestral example warranted *Ráma's* desertion when the flames had testified to her purity. But she instantly recollects herself. *Ráma* is wise—and could not have done anything thoughtlessly. She is only atoning for sins committed in a previous existence. She would therefore enter on a life of penance, in order that, in the next birth, she might have *Ráma* for her husband, without the risk of cruel separation.||

*Sítā* could bear up with the privation and indignity of exile, when she knew that she still remained the undisputed master of *Ráma's* heart.¶ But how are we to measure the depth of *Ausínari's* feelings when convinced of the love at first sight which *Purúravá* had contracted for the nymph *Urvashī*, and sincerely repenting her harsh behaviour on that score, she makes the sacred promise to her Hero :

“ Whatever nymph attract my lord's regard,  
 “ And share with him the mutual bonds of love,  
 “ I henceforth treat with kindness and complacency.”\*\*

To the stupid query of the jester *Mánava* :

“ What, then, is his majesty indifferent to your grace ?”

She replies with dignity :

“ Wise Sir, how think you ; to promote his happiness

\* Ragh., III. 11.

† Ragh., X. 8.

‡ भवन्त्ययमिचारिणो भर्तुरिहे पतिव्रताः । Kumára Sambhava, VI. 86.

§ Kumára Sambhava, VII. 83.

|| Ragh., XIV. 57—66.

¶ Ragh., XIV. 87.

\*\* Vikramorvashī, Act III. Wilson's Hindu Theatre, Vol. I., p. 235.



"I have resigned my own. Does such a purpose

"Prove him no longer dear to me?"

We cannot but exclaim with *Chitrakṣhā* :—

"She is a lady

"Of an exalted spirit, and a wife

"Of duty most exemplary."

**Parental duties.**—The parental relation is a result of the sexual one. In the economy of nature, the subordination of ages is as marked as that of the sexes. The aim of sound morality is not to subvert this natural subordination, but to place it on a satisfactory footing by a well-regulated code of duties and obligations. "There is no other case, which offers, in the same degree, the most respectful spontaneous obedience, on the part of the inferior, without the least degradation; an obedience imposed by necessity first, and then by gratitude; and nowhere else do we see in the superior party the most absolute authority united to entire devotedness, too natural and too genial to be regarded as a duty."\*

Kálidása had a clear conception of the intimate connection between the sexual relation and the parental. He tells us of the Royal pair, *Dilípa* and *Sudakṣhíná*, that when their son shared the affection which was only reciprocal before, the total amount of affection which they had for each other, instead of decreasing as the rule of thumb would require, on the contrary, increased.† Our poet recognised education and support as parental duties, when he described *Dilípa* as the true father of his people, whose education, protection and support, emanated from him; their so-called fathers being mere progenitors—birth-causes.‡ The princes of *Raghu's* royal race were all educated in their boyhood§ and *Raghu*, besides the intellectual training which he received at the hands of learned tutors,|| was initiated into the practice of arms by his own father.¶ The education of *Aja* precedes his marriage\*\* and the necessity of educating and maintaining the infant *Daśaratha* compel the bereaved husband to pass eight long years ere he renounces the world.†† *Ráma* and his brothers were duly educated.‡‡ It was impossible for *Ráma* to look to the education of his sons, but the duty was well discharged by the sage *Válmíkí*, in whose her-

\* Comte's Positive Philosophy, Vol. II., p. 137.

† *Raghu.*, III. 24.

‡ *Raghu.*, I. 24.

§ *मैत्रेयसूत्रविद्यानाम्* । *Raghu.*, I. 8.

|| *Raghu.*, III. 29, 30.

¶ *Raghu.*, III. 31.

\*\* *Raghu.*, V. 38,—40.

†† *Raghu.*, VIII. 92—94.

‡‡ *Raghu.*, X. 79.



mitage the exiled *Sítá* had taken shelter, and given birth to the twins, *Kusha* and *Lava*.\* *Kusha*, true to the traditions of his race, looks first to the education of his son in the royal sciences, and then to his marriage.†

**Filial duties.**—The children on their part are not wanting in the reverential love and grateful requital which is expected at their hands. As the state of society which Kalidasa contemplates, provided for the retreat of householders into the forest when they had passed the third stage of their life,‡ the requital is limited to cheerful obedience.

*Raghu*, when in the bloom of youth he exceeded his father in stature and physical strength, looked shorter on account of his meekness.§ When in his old age, the same monarch wishes to abdicate the throne in favour of his son *Aja* and retire, according to the family custom, to the contemplative shades of the primeval forest, the latter falls at his feet and passionately entreats him not to forsake his son.|| At last, a compromise is effected by the hoary monarch's consenting to spend the remaining portion of his life in a retired grove near the capital.¶ When he had breathed his last, *Aja* is assiduous in the performance of the proper obsequies, as a mark of respect for the deceased, though he knew full well that souls which had obtained final emancipation, are above the reach of such offerings.\*\*

When the kingdom had been offered by his father to *Aja*, the kingdom which princes desire to possess even through the means of the deepest crimes, *Aja* consents to accept it, not through any lust for dominion, but out of a deep sense of the obedience due to a father's commands,†† and to this the modest refusal of *Ayush* in the fifth act of the *Vikramorvashi* furnishes a parallel. When the infants *Ráma* and *Lakshmana* are directed by *Dasaratha* to accompany the sage *Vishwámitra* for the purpose of encountering the ferocious monsters who interfered with the celebration of Vedic rites, they have no excuse to make, no delay to solicit, but are instantly ready to start.‡‡ The cheerfulness with which *Ráma* obeyed the mandate of his father to resign the throne and wander forth an exile for fourteen years in the pathless wilds of *Dandaká*,§§ is too well known to require any detailed description. The filial obedience of *Parashuráma* we leave casuists to analyse and explain.||||

\* *Raghu.*, XV. 13, 32, 33.

† *Raghu.*, XVII. 3.

‡ *Raghu.*, VIII. 11.

§ *Raghu.*, III. 34.

|| *Raghu.*, VIII. 12.

¶ *Raghu.*, VIII. 13, 14.

\*\* *Raghu.*, VIII. 25, 26.

†† *Raghu.*, VIII. 2.

‡‡ *Raghu.*, XI. 1—4.

§§ *Raghu.*, XII. 7—9.

|||| *Raghu.*, XI. 65.



*Sustain the honor of your lineage and be still obedient to thy sire* are the exhortations which *Purúravá* and *Urvashí* respectively address to their son.\*

**Fraternal duties.**—We may here properly enter into the consideration of the fraternal relation. It has been aptly remarked that brotherly love is the best preparation for society. The sons of *Dasaratha* never quarrelled among themselves, even in their infancy.† The devotedness of *Lakshmana* who voluntarily followed *Ráma* into exile,‡ and at last laid down his life for the sake of his brother§ will not easily find a parallel in the whole history of literature. *Bharata's* behaviour, too, in strenuously declining the throne, stands out in bright contrast to the treachery of *Kaikéyi*. He can only be persuaded to guard the throne as the humble servant of his elder brother, and would even then insist on having a visible emblem of *Ráma* in the shape of a pair of slippers which had been hallowed by contact with his feet.|| The faithful manner in which he preserves his trust, and the cheerfulness with which he makes over the kingdom to *Ráma*, furnish as high an ideal of integrity as may well be desired.¶ The records of *Raghu's* royal race do not furnish a single instance of fratricidal struggle such as that which raged over the sick-bed of *Sháh Jahán* or the grave of *Aurungzib*. The healthy feeling which existed between *Ráma* and his brothers, has already been indicated. Their sons inherited this virtue. *Kusha* is peacefully installed by his brother and nephews, as he was their elder both by birth and superior qualities: brotherly feeling was their family trait.\*\*

**Master and Servant.**—We now come to the last division of domestic morals, namely, the duties of master and servant. Slavery was the earliest form of this relation, and though inevitable, nay a decided improvement on the war of extermination which preceded it, had a baneful influence on the whole fabric of domestic morality. Slavery, though incidentally mentioned in the works†† of *Kálidása*, never enters into the composition of any of his pictures. He was also perfectly cognisant of the salient points of the relation of servant and master, namely, cheerful obedience on the part of the one and kind recompense on the part of the other. The dialogue between *Kandarpa* and *Indra* in the *Kumára Sambhava*,‡‡ which is too long for quotation, strikes this key-note. The devotedness of *Dilípa*, too, who was for the

\* *Vikramorvashi*, Act V. *Wilson's Hindu Theatre*, Vol. I., p. 270.

† *Raghu.*, X. 80.

‡ *Raghu.*, XII. 9.

§ *Raghu.*, XV. 92—95.

|| *Raghu.*, XII. 12—19.

¶ *Raghu.*, XIII. 64—67.

\*\* *Raghu.*, XVI. 1.

†† *Kumára Sambhava*, V. 86.

‡‡ III. 2—22.



nonce playing the part of a servant of *Vaśiṣṭha* in charge of his precious cattle, the details of which have been already given, is decidedly exemplary. The Hindu Cupid when summoned for his fatal mission by *Indra*, was painting the feet of his Venus, but such is his promptitude to obey the call, that he leaves one foot unpainted.\* *Urvashī*, when about to cultivate the acquaintance of her loved and loving deliverer, is summoned to assist at a dramatic entertainment at *Indra's* court, and though it cost her an effort, promptly obeys.†

**SOCIAL MORALITY.**—From the home we pass by a natural transition to society. Social virtues may be classified under Justice and Benevolence. In domestic morals the two are blended or at least ought to be, into one harmonious whole.

**Justice, Candor.**—Justice in our thoughts, or candor, is the ornament of all of Kālidāsa's heroes. There is not a single instance in his works of malicious equivocation. The illusions which *Nandini*‡ and *Shiva*§ practise on *Dilīpa* and *Pārvatī* respectively, are benevolent in their conception, and end in agreeable surprise. It would be manifestly unfair to drag into this comparison the dramatic character of the *Vidúshaka*, which is professedly a caricature of human frailty. The equivocation of *Purúravā* with *Ausínari*|| is the most decent course that could be adopted under the circumstances.

**Veracity.**—Of veracity in its widest sense, or Justice in words, Kālidāsa was a great admirer. He makes the princes of *Raghu's* race reticent out of their determination not to speak anything but the truth.¶ Of *Dasaratha* we are told that, like Epaminondas, he never spoke an untruth even in jest,\*\* and of *Atithi* we are informed that what passed his lips was never untrue.†† *Dasaratha's* sincerity must always challenge our admiration, when he kept his word at the expense of his happiness and his life.‡‡

**Gratitude.**—*Priyamvada* is anxious to requite his unconscious liberator *Aja*,§§ and his feeling that without a proper requital, his restoration to celestial rank was vain, finds an echo in the text which *Mallinātha* quotes to the purport that one unable to requite his benefactor had better be dead.||| The *Meghaduta* contains the poet's confession of faith on the subject :

\* Kumāra Sambhava, IV. 19.

† Vikramorvashi, Act II. Wilson's Hindu Theatre, Vol I., p. 221.

‡ Vide ante.

§ Kumāra Sambhava, V. 84.

|| Vikramorvashi, Acts II. III. Wilson's Hindu Theatre, Vol. I., pp. 223, 233—235.

¶ सत्याय मितभाषिणाम् । Raghu., I. 7.

\*\* न वितया परिहासकथास्वपि । Raghu., IX. 8.

†† यदुवाच न तन्मिया । Raghu., XVII. 42.

‡‡ Raghu., XII. 10.

§§ Raghu., V. 46.

||| प्रतिकर्तुमशक्तस्य जीवितान्मरणं वरम् । Mallinātha on Raghu., V. 46.



"Even a low man, when his friend comes to him for assistance, will not turn away his face, in consideration of former kindness."\*

"The Hindus," remarks Wilson, "have been the object of much idle panegyric and equally idle detraction. Some writers have invested them with every amiable attribute, and they have been deprived by others of the common virtues of humanity. Amongst the excellencies denied to them, gratitude has always been particularized; and there are many of the European residents in India who scarcely imagine that the natives of the country ever heard of such a sentiment. To them, and to all detractors on this head, the above verse is a satisfactory reply."† Kálidása extended the duty of gratitude even to benefactors amongst the brute creation.‡

*Benevolence. Civility.*—Kálidása's characters never lack in civility or benevolence in our conversation and manners. *Dilípa* and his queen are honorably received at their preceptor's hermitage.§ *Dasaratha*, we are told, never used a harsh word even to his bitterest foes.|| *Ráma*, when finally bidding adieu to the chiefs of apes and demons who had attended at his coronation, offers them parting offerings through the hands of the Queen in whose rescue they had been instrumental.¶ The anxious frenzy of the exiled *Yacsha* which leads him to address the inanimate cloud as a messenger to convey tidings to his faithful spouse, does not make him omit the formalities of civil reception.\*\* The prefatory civilities†† which the disguised *Shiva* utters to *Párvatí*, and the liberal professions with which the Mountain-king receives the seven sages,‡‡ would bear comparison with the Persian or Chinese code of politeness.

Of active kindness and liberality, we have an instance in *Raghu*, who instituted the *Vishwajit* sacrifice, and at its end gave away all he possessed. §§ The generous struggle between the same king and *Kautsa*, the former bent on giving more than the latter had wanted, and the latter declining to take anything above what he urgently required, ||| furnishes another notable instance of liberality. *Atithi* never revoked his gifts. ¶¶ The kings of

\* न चुद्रोऽपि प्रथमसुकृतापेक्षया संवयाय प्राप्ते मिले भवति विमलः किं पुनर्यस्योद्योगः ॥  
Purvamegha, 17.

† Wilson's Works, Vol. IV., p. 330.

‡ *Raghu*, IX. 65.

§ *Raghu*, I. 55.

|| *Raghu*, IX. 8.

¶ *Raghu*, XIV. 19.

\*\* *Purvamegha*, 4.

†† *Kumára Sambhava*, V. 33—40.

‡‡ *Kumára Sambhava*, VI. 50—63.

§§ *Raghu*, IV. 86. V. 1.

||| *Raghu*, V. 31.

¶¶ यद्दो न जहार तत् । *Raghu*, XVII. 42.



*Raghu's* race never disappointed an expectant even at the cost of life itself.\*

**Hospitality.**—Hospitality is not a rare virtue in the works of Kálidása. *Dilípa* and his attendants are first hospitably received, and it is not until they have recovered from the fatigues of the journey† that any questions are asked. *Raghu*,‡ too, practises the same behaviour towards *Kautsa*. *Bhoja's* hospitality to *Aja* was such that, when they entered the capital, the host looked as guest and the guest as master of the household.§ We are told in the *Kumára Sambhava*|| that great men take even inferior refugees under their special protection.

**Friendship.**—Friendship is placed by the poet on the widest basis.¶ The most casual occurrence may lay its foundation. The attachment of the celestial nymphs to *Urvashí* is full of affection and sympathy.

**POLITICO-MILITARY MORALITY. Conquest. Chivalry.**—Kálidása's military morality comprised conquest for its own sake. His conquerors are always satisfied with formal submission and their greatest glory is to reinstate fallen foes.\*\* His warriors have chivalry enough to restrain them from taking undue advantage of an opponent's weakness.†† The sage councillors of *Raghu* laid before him plans both honest and dishonest, for the encompassing of his ends, but he disdained to take advantage of the latter, and relied on honesty as the best policy.‡‡ *Atithi's* martial policy was guided by the same principles.§§ Kálidása appreciated the intimate correlation which exists between prudence and valor. Valor without prudence, he justly remarks, is but animal ferocity, and prudence without valor, is but another name for cowardice.|||

**Kingly virtues.**—Kálidása could rise to just conceptions of political morality. His kings are mild taxers and take but to expend on proper objects.¶¶ They are no respecters of persons, but impartial dealers out of rewards and punishments.\*\*\* They never abused the rigor of the law for private purposes, and presided personally over the administration of justice.††† They are as affectionate fathers to their subjects.‡‡‡ A *Rájá* does

\* *Raghu.*, X. 2.

† *Raghu.*, I. 58.

‡ *Raghu.*, V. 2, 3.

§ *Raghu.*, V. 62.

|| I. 12.

¶ *Kumára Sambhava*, V. 39; *Raghu.* II. 58.

\*\* *Raghu.*, IV. 35, 37, 43, 64. VIII. 9. IX. 14. XI. 89. XVI. 80. XVII. 42.

†† *Raghu.*, VII. 47.

‡‡ *Raghu.*, IV. 10.

§§ *Raghu.*, XVII. 69.

||| *Raghu.*, XVII. 47.

¶¶ *Raghu.*, I. 18, 26. VIII. 7.

\*\*\* *Raghu.*, I. 6, 25. IV. 8. IX. 6.

††† *Raghu.*, VIII. 18.

‡‡‡ *Raghu.*, I. 24. II. 48.



not deserve the name if he be not—प्रहृतिरञ्जन,—gladdener of his subjects.\* To his being void of avarice the people owed their wealth; to his protection they were indebted for whatever deeds of virtue they performed in peaceful leisure; the king was their father in being their instructor and guide, the king was their son inasmuch as he was the wiper of their woes.†

**Self-abnegation.**—The kings of Kálidása had sufficient moral convictions to subordinate their personal happiness to the general weal. This self-abnegation is held up by the poet in the most prominent light. *Dilipa*, we are told, loved a good man, though an enemy, and discarded a favourite, when he took to evil ways, with the merciless promptitude which one must shew in excising a snake-bitten finger.‡ They had a high idea of their mission as redressers of wrong, and were ready to carry it out even at the risk of their throne and life. So equitable is the behaviour of the model king that every one thinks himself the greatest favourite.§ *Aja* is restrained from following his beloved queen on the path of flame, not by reason of any fondness for life, but from a sense of what is due to his position as a king.|| In the characteristic phraseology of the poet, kings are wedded to the earth.¶ Their personal pleasures never encroached on their public functions.\*\*

**Loyalty.**—This healthy feeling was reciprocated on the part of the people. They took a personal interest in their sovereign. They participated in his good fortunes and sympathised with his losses.††

**ALTRUISM.**—The key-stone of morals — Live for others — did not escape the penetration of Kálidása. We may quote his own words:

बलमार्तभयोपशान्तये  
विदुषां सत्कृतये वज्र श्रुतम् ।  
वसु तस्य विभोर्न केवलं  
गुणवत्तापि परप्रयोजना ॥‡‡

Power, to remove the fears of the afflicted; great learning, for the cordial reception of the learned; not only the wealth, but even the good qualities of that King (*Aja*), were for the benefit of others.

\* Raghu., IV. 12. VI. 21.

† Raghu., XIV. 23.

‡ Raghu., I. 28.

§ Raghu., VIII. 8.

|| Raghu., VIII. 72.

¶ वसुमत्या हि दृषाः कलविणः । Raghu., VIII. 83.

\*\* Raghu., VIII. 32. XIV. 24.

†† Raghu., II. 73, 74. VIII. 74.

‡‡ Raghu., VIII. 31.



*An Imperial Assemblage at Delhi three thousand years ago.—*  
*By RĀJENDRALĀLA MITRA, LL. D.*

The Imperial Assemblage to be held at Delhi on the 1st of next month cannot fail to recall to the mind of oriental scholars the description, given in the Mahābhārata, of a similar gathering held there upwards of three thousand years ago. Then, as now, the object was the assumption of paramount power by a mighty sovereign. Then, as now, princes and potentates came from all parts of India to do homage to one who was greatly their superior in power, wealth, and earnest devotion to rule honestly and paternally. Then, as now, the feeling of allegiance was all but universal. But noteworthy as these points of similitude are, there are others which place the two assemblages in marked contrast. The one was held by men who had barely emerged from a state of primitive simplicity in the infancy of human society; the other is to be inaugurated under all the refinements and paraphernalia of the highest civilization. The one borrowed all its sanctity from religion; the other depends for its glory on political and material greatness. The one was purely national; the other brings into the field a dominant foreign power. There are other points, equally remarkable, both of similitude and of divergence, which afford singular illustrations of the state of political ideas at immensely remote periods; and a short account of the ancient ceremonial may not, therefore, be uninteresting at the present time.

The ceremony, in ancient times, was called the *Rājasūya*, or that which can be effected only by a king—from *Rājan* 'a king' and *shu* 'to be effected'. This derivation, however, is not universally accepted. Some interpret the term to mean the ceremony at which the *Soma* juice is produced, from *rājā* 'moon' for the moon-plant, and *su* 'to bring forth'; but as there are a hundred different rites at which the brewing of the *Soma* beer is an essential requirement, while it is distinctly laid down, that none but a king who can command the allegiance of a large number of tributary princes, and who is, or wishes to be,\* a universal monarch, exercising supremacy over a large number of princes, should perform it, the first derivation appears to be the right one,—at least it conveys an idea of the true character of the ceremony, which the other does not. Yājñika-deva, in his commentary on the Śrauta Sūtra of Kātyāyana, explains the word *rājā* in the first aphorism on the subject, to mean a Kshatriya,† without specifying that he should be a king, and this may at first sight suggest the idea that any Kshatriya,

\* राजा ह्यराज्यकामो राजसूयेन यजेत । Taittiriya Brāhmaṇa.

† राज्ञ राजसूयः ॥ १ ॥ स चायं राजशब्दः क्षत्रियजातिनिमित्तः ।



whether a sovereign or not, may perform it; but the context shows clearly that a king was a *sine qua non*, and none but a king could undertake the rite. According to the *Sástras*, none but a Kshatriya was fit for royalty, and the use of the word *rájan* both for a king and a man of the Kshatriya caste was so common, that in interpreting it, in particular passages the context is always looked upon as the safest guide to its true meaning. If we assume, however, that Kátyáyana wished only to indicate the caste of the performer, with a view to exclude the other castes, without caring to point out his political position, the interpretation of the scholiast would be open to no exception.

From its very nature a ceremony like the *Rájasúya* could not be common anywhere, or at any time, much less during the Hindu period, when India was never held by a single monarch. It was then divided into many kingdoms, principalities and chiefships, each enjoying perfect autonomy, and entertaining more or less jealousy, not unoften amounting to hostility, or even violent animosity, against each other, and a universal sovereignty like that of the autocrat of Russia was perfectly impossible. The language of praise or flattery has doubtless often declared particular sovereigns to have been *Chakravartins* or emperors; but the reality, as regards the whole of India, was never accomplished. It is unquestionable that in rare instances, such as those of Chandragupta and Asoka, many sovereigns acknowledged subordination to some mighty monarch or other, and the weaker ones paid tribute, but their autonomy was rarely sacrificed, and their alliances generally bore the character of confederacies, or federal union, and not that of feudal baronies subject to a ruling chief, and under no circumstances were servile duties, such as under the feudal system the Barons in Europe were obliged to render their suzerains, ever exacted from the tributaries. The bond between them was, besides, of the feeblest kind, and snapped at every favourable opportunity. In the Vedic period even such monarchic federations on a very large scale were any thing but common, and the rite of *Mahábhisheka*, or imperial baptism, which follows the *Rájasúya*, was administered to only a few. The *Aitareya Bráhmaṇa* of the Rig Veda affords a curious illustration of this fact. After describing the ritual of the *Mahábhisheka*, with a view to point out its high importance, the author of that work gives a list of the persons who had been inaugurated by that rite, and of the priests who officiated thereat, and it includes only ten names.\* The list does not, it is

\* The list includes the following names: 1. Janamejaya, son of Parikshít, inaugurated by Taru, son of Kavasha. 2. Sárýáta, son of Manu, anointed by Chyavana, son of Bhrigu. 3. Somaśushmá, son of Vájaratna, by Satánika, son of Satrujit. 4. Ambashtya, by Parvata and Nárada. 5. Yudhámárashti, son of Ugrasena, by Parvata and Nárada. 6. Vis'vakarmá, son of Bhuvana, by Káśyapa. 7. Sudás, son of Puja-



true, profess to be exhaustive; but the necessity felt for such a list and its meagreness suffice to show, that the rite was but rarely performed, and even the knowledge of its ritual among the priesthood was not common. The Rāmāyana describes the rite as celebrated by Rāmachandra, but there is no description of it in any later work; and no manual for its performance has yet been met with.

The description of the Rājasūya in the Mahābhārata is a popular poetical one, loaded with much that is mythical, and a considerable amount of exaggeration; but it is the best known all over India, and comprises the fullest account of its exoteric characteristics. Yudhishthira, the hero of it, lived, according to Hindu chronology, in the last century of the third cycle or the Tretā Yuga, *i. e.* five thousand one hundred and fifty years ago; but recent researches of oriental scholars are fatal to his claim to so remote an antiquity. A careful study of the lists of ancient kings given in the Purāṇas, allowing an average reign of sixteen years to each king, would bring him to the twentieth century before the Christian era. But even this is not tenable. On the other hand the existence, in the Aitareya Brāhmaṇa, of the name of Janamejaya, son of Parikshit, who is evidently the same with the sovereign named in the Mahābhārata, and the grandson of Arjuna brother of Yudhishthira, would force the inference that he lived long before that portion of the Rig Veda came into existence; and the lowest estimate possible appears to be somewhat over twelve centuries before the era of Christ.

Yudhishthira and his four brothers lost their father Pāṇḍu,\* king of Hastināpura, at an early age; and during their minority the management of their paternal state fell into the hands of their uncle Dhritarāshṭra, under whose guardianship they were brought up. Dhritarāshṭra was senior to Pāṇḍu, and would have, under ordinary circumstances, inherited the principality of Hastināpura. But as he was born blind, his claims were set aside, according to Hindu law, in favour of his younger brother. The principality having, however, come to his hands during the minority of his nephews, court intrigue was brought into play, when the youths came of age, to prevent their coming into possession of even a portion of their patrimony. The sons of Dhritarāshṭra were most inimical to them, and domestic dissensions were frequent and serious. To prevent these unseemly disputes, the

vana, by Vasiṣṭha. 8. Marutta, son of Avikshit, by Samvarta, son of Aṅgiras. 9. Aṅga *alias* Alopāṅga by Udamaya, son of Atri. 10. Bharata, son of Dushyanta, by Dīrghatamas, the son of an unmarried woman.

\* The word means "pale yellow" and is ordinarily used to indicate jaundice. Mr. Wheeler opines that it is a euphemism for white leprosy, but there is nothing to justify the theory. Kuntī is said to have selected him from out of a whole host of princes at a grand sayañvara; and no damsel is ever likely to select a leper for her consort.



Pándava brothers were sent away to Váranávata, modern Alláhábád, where, it was thought, they would be beyond the reach of their intriguing cousins. But those who interested themselves in the welfare of the Pándavas were doomed to disappointment. The palace, which the five brothers and their mother occupied at Váranávata, was, one night, set on fire, and they had to fly for life, and, for some time after, to keep themselves secreted in jungle and unfrequented places, or roam about as beggars. At last they effected an alliance with the powerful king Drupada of Panchála (modern Kanauj), whose daughter they married at a Sayañvara, and through his influence and that of their cousin-german Krishna, obtained a small tract of land for their share with the town of Indraprastha for their capital. Here they established themselves, and laid the foundation of what afterwards became a mighty empire.

Close by Indraprastha, there happened to be a large forest,\* which the Pándavas burnt down and cleared, and by dint of perseverance, and gradual encroachment on the possessions of their less energetic neighbours, raised their little tract of land to the rank and position of a respectable principality. Alliances with some of the aboriginal races also helped them to rise in power; and the extension of their possessions towards the west and the south-west, where they met with little opposition, soon enabled them to assume a high position among the crowned heads of India. A magnificent palace, called a *Sabhá* or 'audience chamber', was next built in the capital, and it proved to be the finest work of art that had ever been produced in this country. A Titan (Dánava) was its architect, and it was enriched with the most

\* The existence of this forest has suggested to Mr. Wheeler the idea of Delhi, or the country about it, having been an outpost of the Aryans in India at the time of the Pándavas, and the whole of his criticisms on the Mahábhárata is based upon this major. That there were many forests in the country three thousand years ago, is a truism which none can venture to question, but there is no valid reason to suppose that the Khandava forest was the *ultima thule* of the Aryans at the time in question. The line of argument which has brought the learned author to this conclusion, could be appealed to with great effect, to show that the jungle of Chataurá near Jagadispur in which the mutineers under Kumar Singh, found a shelter, was the outpost of the English ráj in 1858. To save his position, the author has been obliged to denounce the whole of the geography of the Mahábhárata as after thoughts. The poet says that Bhisma got into his chariot, went to Kási, and brought the three daughters of the king of that place, as brides for his younger brother, and the critic exclaims, "Kási is 500 miles from Hastinápura," and as no one could make the journey so easily and without attendants, the place meant must be a village in the neighbourhood of Hastinápura; as if it was absolutely necessary for a poet to give in detail the number of the attendants, the places where they halted, and the stages they travelled over. Chand, in the 12th century, with nearly as much laconic brevity, makes his hero Prithviráj travel to Kanauj from Delhi on a like mission, and it was crowned with equal success. It is not likely that any historian will question the truth of the elopement of the Princess of Kanauj.



precious materials that could be collected from the different parts of India, including some highly-prized stones from the Himālaya. Its description refers to flowers of crystal, partitions of glass, and marbles of all colours; to spacious and lofty apartments, and doors and windows, terraces and gardens, artificial lakes and fountains. Much of this is doubtless due to the poet's imagination; but there was nevertheless enough to make the owner proud of its possession, and to long to show it to his rivals. To inaugurate it by a grand festival was the first idea that occurred to his mind, and that suggested the ambitious scheme of celebrating the politico-religious sacrifice of the Rājasūya, and raising the principality to the rank of an empire.

This was, however, not an easy task to accomplish. Close by, to the north, there was Hastināpura, the capital of their ancestors, in the possession of their inveterate enemies the Kurus. To the east, Mathurā was held by a powerful sovereign. To the south, the king of Mālava was a standing menace, and to the west there was the principality of Virāṭa,\* which would not in a hurry yield to its neighbours. There were besides other mighty sovereigns in different parts of India, who were proud of their high position, and not at all disposed to succumb to what to them was a new-born and petty Rāj.

The most powerful king at the time, however, was Jarāsandha, sovereign of Magadha. He had carried his victorious arms as far as Mathurā, and expelled therefrom the Yādavas, who had wrested it from a relative of his. His army was the largest and best-trained; and he had already imprisoned ninety-seven princes with a view, when the number came up to a hundred and twelve, to offer them as a sacrifice to the gods, by way of a preliminary to his raising the white umbrella of imperial sovereignty. For the Pāṇḍavas to wage war against him, with any hope of success, was out of the question, and no one in India could proclaim himself an emperor without bringing on a most desolating retribution from that monarch.

To remove Jarāsandha from the field by other than open warfare was, therefore, the first scheme to which the Pāṇḍavas set their head, and assassination was resolved upon as the only means feasible. Disguised as Brāhmaṇas, Bhīma, Arjuna, and Kṛishṇa set out for Magadha, and, entering the palace by a back door, took him unawares, while he was engaged in his prayers, and killed him. The Mahābhārata gives a long account of the interview, and says, he was challenged to a single combat, and fell under the blows of Bhīma, the "wolf-stomached" hero. But this appears to be a euphemism for assassination, inasmuch as the Pāṇḍavas were ever after

\* The modern Bengal districts of Rangpur and Dinājpur to the north claim to be the ancient Virāṭa, but the cattle-lifting foray of the Kurus in the country of Virāṭa, described in the Virāṭa Parva of the Mahābhārata, leaves no doubt as to the true position of that country having been as given above.



accused of baseness for it, and no baseness could be predicated of a hero who challenged another to a single combat. However that may have been, it enabled the Pándavas to liberate the imprisoned chieftains, and, not only at once to secure to themselves their loyal adherence, but also to obtain a great accession of power and influence in different parts of India.

Four grand military expeditions were next organised, one to proceed to each quarter of India. Arjuna assumed the command of the army of the North, and, proceeding on, successively conquered, or otherwise brought into subjugation, the Kulindas, the Kálakúṭas, the Avarthas and the Sákala-dvīpis. Thence he proceeded to Prágjyotisha, where he had to wage a protracted war against Bhagadatta, its king, who was ultimately obliged to purchase peace by the payment of a handsome tribute. Ascending the Himálaya, he encountered many petty chieftains, including those of Uluka, Modápura, Vainadeva, Sudáman, Susankula, North Uluka, Devaprastha and other places, —mostly robber chiefs,—as also the Kirátas and the Chínas. Turning then towards the west, he pushed on his victorious army through Káshmir to Balkh, burning and sacking several large towns in the way. Then turning back, he passed through Kámboja, Darada, and Uttara-rishika from all which places he obtained highly-prized horses as tribute, and arrived at the foot of Dhavalagiri, where he rested for awhile. Then he crossed the Himálaya and encountered the sovereigns of Kimpilla-varsha and Hálaka, the last in the neighbourhood of the Mánasarovara Lake; and lastly approached the confines of Uttara-kuru, which was inhabited by Gandharvas, the fabled choristers of Indra's heaven. Here he was met by ambassadors, who purchased peace for their sovereign by a present of some rich stuffs, jewels, valuable furs, and silken dresses.

The second expedition was headed by Bhíma, who proceeded to the east, taking in the way the country of his father-in-law Drupada in the Doab of the Ganges and Yamuná. Then crossing the Ganges he went southwards to Dasárṇa, and, taking the Pulindas in the way, arrived at Chedi, the country of Sisupála, who, being related to the Pándavas, readily acknowledged subordination, and paid a handsome tribute. Bhíma tarried at this place for a month, and then marched on successively to Kośala, Ayodhyá, Uttara Kośala, Mulla, and the Terai, whence descending down he conquered the king of Kási. His next encounter was with the Matsyas, then successively with the Maladas, Madadháras, the Batsabhumians, the Bhangas, the Santakas and Barmakas, and several Kiráta and other races, which he conquered, and, making an alliance with the king of Mithilá (Videha), came down to Magadha to collect tribute, having on a former occasion destroyed its valiant king Jarásandha. The son of Jarásandha joined his army along with several minor chiefs, and with them he proceeded to the country of his half brother Karṇa, (Bhágampur) who was



always inimical to the Páṇḍavas, and waged a protracted war in defence of his rights. But his efforts were of no avail, and he was ultimately made to negotiate for peace by the payment of a heavy indemnity. Bengal and its numerous petty chiefs next attracted the attention of Bhíma, and they were all overpowered and obliged to enrich the conqueror with large contributions of gold, silver, jewels, sandal-wood, agallochum, wool, and rich stuffs.

The army of the South, under Sahadeva, first overpowered the king of Mathurá, and then, proceeding through the northern parts of country now owned by Sindhia, in which it encountered and subjugated many hostile chiefs, came to the country of Kuntíbhōja. This aged monarch was the foster-father of Kuntí, the mother of the three elder Páṇḍavas; he welcomed the general with every mark of consideration, and readily entered into the scheme of his eldest grandson to assume the imperial title. He gave much wealth and valuable assistance in pushing on the expedition with success. Crossing the Chambal, Sahadeva came face to face with the heir of Jambhaka, an old enemy of Kṛishṇa. What the name of the prince was or of his country, is not given, but the prince was powerful and fought with great courage. He was, however, ultimately overpowered, and made to render homage and to pay an indemnity. The Narmaddá was next crossed, and Sahadeva, in his victorious march, successively made a lot of petty princes to acknowledge his supremacy, until he reached the Pandyan kingdom which held him at bay for a time. Kishkindá proved even more troublesome, and a treaty of amity and friendship was all that could be extorted from it. Beyond Kishkindá was the country of Mahisamati (probably Mysore) which was owned by a chief of great valour, who was especially favoured by the god Agni, who had seduced a daughter of the king, and afterwards married her, and promised protection to his father-in-law. Sahadeva and his army were no match for this mighty chief, and Agni so befriended his protégé by raining fire on every side that the assailants were well nigh overpowered. At this juncture Sahadeva sought the protection of Agni, and through his intervention effected a treaty of peace and friendship. The story of Agni affords an instance of the use of fire-arms in ancient times, and also a hint about the Nair custom of women not living under the protection of their husbands, but of cavaliers of their own choice; for in order to wipe off the stigma on the character of the princess, Agni, says the story, had ordained that women in Mahisamati should ever after lead a wanton life in public (*Avárapīyá*) independently of their husbands.

Proceeding further south from Mahisamati, Sahadeva subjugated several petty chiefs, as also several one-eyed, one-legged, or otherwise deformed races, described in the orthodox style of traveller's stories, and thence, through ambassadors, secured the allegiance of Draviḍa, Sarabhipattanam,



Támra island, Timiñgila, or the country of the whale, Kaliñga, Andhra, Udra, Kerala, Tálavana, Ceylon, and other places. On his way home, he passed along the western coast through Surat to Guzerat where he met Kṛishṇa and the other Yádava chiefs, and finally returned home, loaded with immense wealth and many valuable presents.

Nakula, at the head of the army of the West, first went to Rohitaka; thence towards southern Rájputáná to Mahettha, Sivi, Trigarta, Ambashṭha, Málava, Panchakarphaṭas, Mádhyamaka, Vátadhána; and, then retracing his steps to Pushkara, and next the Abhira country on the banks of the Sarasvatí, he marched on to the Panjáb, to the western frontier of which he encountered the Pahnava, Varvaras, Kirátas, Yavanas, and the Sakas, from all of whom he obtained valuable presents, and acknowledgment of allegiance.

In making the above abstract of the progress of the different armies, I have omitted several names of places and persons, and also used words to indicate directions which do not always occur in the original. The routes, as laid down in the Mahábhárata, are not always such as an invading army would, or conveniently could, take in its progress from Indraprastha, and many reasons suggest themselves to show that the poet was not quite familiar with the places he describes. Some of the discrepancies, however, may be due to my inability to identify the several places named, and to the possibility of there having existed more than one place of the same name, one of which is known to me, and the other not. Several districts in northern and eastern Bengal now claim to be the same with places named in the Mahábhárata, but which probably have no right to the pretension. In a few cases, there are two or three claimants for the same ancient name. As it is, however, not my intention here to enter into a critical analysis, but simply to quote the substance of what has been said, in connexion with the Rájasúya, in the Mahábhárata, by way of introduction to the rituals of the sacrifice as given in the Vedas, I need say nothing further on the subject. Those who are curious about the places named, and about the articles alleged to have been presented as tribute, which, to a certain extent, help the identification of those places, will find much interesting matter in the late Professor Lassen's learned essay on the Geography of the Mahábhárata, in the Göttingen Oriental Journal, and in Professor Wilson's paper on the Sabhā-parva in the Journal of the Royal Asiatic Society of London.

On the return of the different expeditionary armies, a consultation was held as to the propriety of immediately commencing the ceremony, or deferring it to a future occasion. Kṛishṇa advised immediate action, and agreed to take upon himself the task of arranging everything for a successful issue. It was accordingly resolved that the ceremony should at once begin. Orders were thereupon issued to collect all the articles necessary for the rite; invitations were sent out to all relatives, friends, allies and tributaries, the



messengers being instructed to request the attendance of Vaiśyas and "all respectable Sūdras" ; Nakula was deputed to the old king Dhritarāshṭra, the head of the family, to invite him and other Kaurava chiefs to grace the assembly by their presence ; and ample provision was made for the accommodation and entertainment of the expected guests. The Bráhmaṇs were expected to come in from all parts of the country, and every one was to be received with due honour, and to be rewarded with rich presents. The invitations to the Vaiśyas and the Sūdras, the agricultural and the servile classes, at a religious ceremony, and the use of the epithet *mānya* "respectable" or "venerable" as a predicate for individuals of the class originally formed of helots, are worthy of special note. "This is", says Professor Wilson, "one of the numerous indications which the Mahābhārata offers of a state of public feeling and possibly of civil institutions which seems to have preceded even the laws of Manu."\*

The most important business in connexion with the sacrifice was the appointment of duly qualified priests, and the most renowned sages of the time were solicited to take parts in the grand ceremonial. Kṛṣṇa-dvāpāyana Vyāsa, the natural father of both the Kurus and the Pāṇḍavas, who was renowned for his thorough knowledge of the Vedas which he had arranged and classified, himself took the part of Brahmá or high priest. Susámā of the Dhananjaya clan was appointed the chief of Sāma singers. Yājñavalkya, the great lawgiver, was installed as Adhvaryu or the chief of the Yajur Vedic priests. Paila, son of Kasu, and Dhaumya, the family priest of Yudhisṭhira, undertook the duty of pouring out the oblations on the sacred fire (*hotá*) ; while a host of their pupils and others were employed to act as assistants and assessors to watch the proceedings and correct mistakes (*sadasya*).

"In due course and at the proper time, Yudhisṭhira was initiated into the ceremony by the assembled priests, and thus initiated and attended by his brothers and surrounded by thousands of Bráhmaṇs, relatives, friends, officers of State, and princes from different countries, he, resplendent as the incarnation of Dharma, entered the Sacrificial Hall. Learned Bráhmaṇs, versed in the Vedas and the Vedāṅgas, flocked from all parts of the country. Architects had, under the king's orders, erected suitable abodes for them, and those abodes had beautiful awnings on the top, and were replete with furniture and articles of food and drink fit for all seasons of the year. Receiving the welcome of the king, the Bráhmaṇs dwelt therein, and passed

\* Journal, Rl. As. Soc. VII. 138. In Mr. Wheeler's version the epithets *sarvān mānyān* "all respectable" are placed against both the Vaiśyas and the Sūdras, but the construction of the sentence requires that they should apply to the Sūdras only, showing that the three twice-born classes were all welcome, whereas of the unregenerate Sūdras, the "respectable" alone were admissible.



their time in entertaining conversation, in witnessing charming dances, and in listening to sweet music. The hum of Bráhmans, full to satiety, fond of stories, and jubilant with delight, resounded every where. "Give away, and eat away" were the words which burst forth from every side. The virtuous king provided for each of his guests thousands of cows, bedding, gold, and damsels. Thus did the ceremony progress of the unrivalled and virtuous sovereign of the earth, the great Páṇḍava, who was like unto Indra, the lord of the immortals.\* The provision of damsels for the service of Bráhmaṇ guests, reveals a curious feature in the manners, customs, and morality of the time under notice.

The list of crowned heads which assembled at the ceremony is a long one, but as it includes mostly the names of those who were subjugated by the brothers of Yudhishtira, and of the friends and relatives of the host, it is not necessary to reproduce it here. The leading chiefs of the Kaurava and the Yádava tribes were the most prominent among the guests. "To the guests were assigned dwellings replete with refreshments of every kind, and having by them charming lakes, and ranges of ornamental plants. The son of Dharma welcomed them in due form. After the reception, the princes repaired to the several houses assigned for their accommodation. Those houses were lofty as the peaks of the Kailása mountain, most charming in appearance, and provided with excellent furniture. They were surrounded by well-built high walls of a white colour. The windows were protected by golden lattices, and decorated with a profusion of jewellery. The stairs were easy of ascent; the rooms were furnished with commodious seats and clothing and garlands; and the whole was redolent with the perfume of the finest agallochum. The houses were white as the goose, bright as the moon, and looked picturesque even from a distance of four miles. They were free from obstructions, provided with doors of uniform height, but of various quality, and inlaid with numerous metal ornaments, even as the peak of the Himálaya. The princes were refreshed by the very sight of the mansions."†

With a view to prevent disorder, and to enforce discipline and the due despatch of business, Yudhishtira so arranged that each department of the ceremony should be placed under one of his principal relatives, or of a friend. To see to the proper distribution of food was the task assigned to Duhsasana, brother of Duryodhana. To Ásvathámá, "a warrior Brahman of saintly descent," was assigned the duty of attending to the reception and entertainment of Bráhmans, and to Sanjaya the same duty with reference to the regal and military guests. The venerable old chief Bhishma and the equally venerable chief Droṇa were solicited to act as superin-

\* Mahábhárata, Book II, chapter 32.

† Ibid., chapter 33.



tendent-generals, and to see that nothing went amiss. To Kripa, "another saintly personage", fell the duty of distributing presents of gold and jewels. Bāhlika, Dhritarāshṭra, Somadatta, and Jayadratha, were requested to act as masters of the ceremony; Duryodhana was requested to see to the due receipt of the presents and tributes brought by the assembled guests; and Kṛishṇa undertook to wash the feet of the Brāhmanas.

Passing over some fulsome panegyric on the profusion of wealth brought by the tributaries, and the lavish way in which it was distributed among Brāhmanas and others, we come to the last day of the ceremony, when Yudhisṭhira sat amidst the assembled guests in imperial magnificence ready to receive the homage of all as the sovereign lord of India. The enthusiasm all round was overflowing, and the praises of the great chief resounded on every side. The priests had offered their last oblations on the sacred fire, and all eyes were turned towards "the observed of all observers", "the cynosure of every eye", to behold the crowning act of this majestic ceremony, the acknowledgement of allegiance to the noble chieftain. Bhīshma, at this moment, rose from his seat, and, advancing to the foot of the throne, addressed the chief, saying, "It is your duty, O chief, first to show your respect to the assembled guests. Six are the persons, who receive, on such occasions, that mark of respect, the *arghya*; and these are the tutor, the chief priest, the brother-in-law, the sprinkler of the holy water, the king, and the dearest friend. They have all assembled here, and abided with us for a year; let an *arghya* be prepared for each of them, and it is for you to select whom you would honour most."\*

The offering proposed was not a part of the religious ceremony, but a mark of social distinction, and it consisted of flowers, sandal paste, a few grains of rice, and a few blades of Durva grass sprinkled with water. From what time this offering has been current in this country, it is impossible now accurately to determine; but there is no doubt that it has been known from a very early period, for it is named in old ritualistic works as an offering meet for gods. Ordinarily this is preceded by another offering called *Pādya*, or water for washing the feet. To a guest coming from a distance nothing is more refreshing in a hot climate, like that of India, than a wash, and essences and flowers immediately after it, cannot but be grateful. And what were at first necessities soon assumed the character of formal ceremonial acts, and to this day the offerings are regularly made in the orthodox form to bridegrooms and priests. In a modified form the *arghya* appears under the name of *mālya-chandana* or "flower garlands and sandal paste", which are offered to all guests on quasi-religious ceremonial occasions, such as marriages, śrāddhas, &c., social distinction being indicated by the order in which the offering is made, the noblest guest getting it

\* Mahābhārata, Book II, chapter 35.



first, and the rest successively according to their respective ranks. The law of precedence is strictly observed, and frequent disputes arise whenever there is a departure. Within the last fifty years there have been at least a dozen disputes in Calcutta alone about the claims of particular individuals to this honour. At other than religious or quasi-religious ceremonials, the sandal paste is replaced by otto-of-roses, and the garlands by bouquets. The Muhammadans in India adopted the custom from the Hindus, and at Darbárs substituted prepared betel leaf (*pán*) for the nosegay. In this last form the Governors-Generals and Viceroys of Her Britannic Majesty have hitherto honoured their Indian guests. Yudhishthira, knowing well how ticklish people were on the subject, declined to decide the question as regards the king who should first be honoured, and sought the advice of his friends.

Bhishma was of opinion that Krishna was the most renowned among the princes, and should first receive the mark of respect. Others also sided with him; and, the natural bearing of Yudhishthira being in favour of his dearly-beloved and faithful cousin, the offering was presented to him. The act, however, proved a veritable apple of discord. Sisupála, king of Chedi, could not at all tolerate it, and denounced it as grossly partial and unjust. In a long and eloquent speech he showed that Krishna was not a king, as his father and elder brother were living, and there were several potentates present who were infinitely his superior, and that on an occasion like the Rájasúya, the question of precedence was of vital importance, and should not be hastily disposed off. Addressing the Pándavas and Bhishma, he said—

“In the presence of the assembled host of kings, Krishna is by no means entitled to this distinction. Through favour alone you have done him the honour, and it is unworthy of you. You are, however, young, and know nothing of what is becoming in such cases; the duty in such cases is a delicate one, while Bhishma (whose advice you have accepted) is narrow-minded, and has long since lost his senses. Time-serving saints like you, Bhishma, are detestable in the assembly of good men. Under what semblance of reason have you presented the *arghya* to Krishna who is not a king? and with what face has he, in an assembly like this, accepted the offering? Should you think him to be senior by age, he cannot in the presence of his father Vasudeva deserve the honour. It is true Krishna has always been a well-wisher and follower of you, sons of Kuru, but it is unbecoming of you to give him the precedence in the presence of (your father-in-law) king Drupada. If you have done him honour under the impression of his being an Áchárya or expounder of the Sásstras, you have been equally wrong, for he cannot claim precedence where the venerable professor Droṇa is present. Equally have you done wrong if you say that you have selected him as a priest (Ritvig) of the highest distinc-



tion, for he cannot earn that distinction in the presence of the hoary-headed Dvaipáyana (Vyása). How dare you raise Kṛishṇa to a higher position than that of such noble personages as the son of Sántanu, the noble Bhíshma who can command his own death, the valiant hero and highly learned Ásvathámá, the king of kings Duryodhana, the most learned professor of Bhárata, Kripa, the learned professor of Kimpurusha Druma, king Rukmí, and Salya, king of Madra? Is it becoming that you should set aside the favourite pupil of Jamadagni, one who has, by his own valour, conquered, in fair fight, the whole race of kings, that valiant hero Karna in favour of Kṛishṇa? The son of Vasudeva is not a priest, nor a professor, nor a king, and you have selected him solely because you are partial to him. Besides, if you had made up your mind to honour Kṛishṇa, why have you insulted these kings by inviting them to such an assembly? We did not pay tribute to the honorable son of Kuntí from any fear, or flattery, or hopes of favour; we thought him engaged in a noble act and worthy of the rank of a suzerain, and therefore yielded to him; and he has failed to treat us with becoming respect. He has in this assembly offered the *arghya* to Kṛishṇa who is in no way deserving of it, and he could not have insulted us more seriously. The claim of the son of Dharma, to be the most virtuous, is false, for what virtuous person offers worship to one who is bereft of all merit? Yudhishthira has behaved meanly, and resigned all pretention to a sense of justice and duty, by offering the highest honour to that wicked scion of the Vrishni race who nefariously assassinated the noble king Jarásandha. The sons of Kuntí are, however, cowards, mean, and wandering beggars, and through their meanness they may offer you the honour; but it was your duty, Kṛishṇa, to reflect upon the propriety of the act. How could you, knowing yourself to be unworthy, barefacedly accept the offering? Even as a dog, having in private tasted a drop of butter, prides itself upon it; so are you feeling elated by the honour you have got; but know well that the offering is not an insult to the royal guests, but a ridicule cast on you. Even as the marriage of a eunuch, or the attempt of a blind man to enjoy the pleasures of colour, is absurd, so is the tribute of royalty paid to one who owns no kingdom. This act of to-day fully illustrates the nature of Bhíshma and Yudhishthira's claim to good sense, and the character of Kṛishṇa."\* Saying this, he rose from his seat, and was about to leave the assembly along with some of the guests; when Yudhishthira came forward and tried his best to pacify the irate chief. Bhíshma, Bhíma, and others also interposed; but to no avail. Sísupála, naturally of an ungovernable temper, spoke in the most violent terms. He inveighed particularly against Bhíshma for his advice, and bitterly taunted Kṛishṇa for his many shortcomings. Words rose high, and the

\* Mahábhárata, II, chapter 36.



tumult became general. The proud and martial spirit of many of the chiefs sided with the king of Chedi, and from words they rushed to arms, when Kṛishṇa, in a fit of passion, knocked off the head of Śiśupála with his discus, and brought the tumult to an end.

Mr. Wheeler is of opinion that this legend has been engrafted by the Bráhmaṇical compilers on the story of the Pándavas for a sinister purpose. His arguments are,\* 1st, Because "the legend is at variance with the mythic account of the pavilions from which the Rájás are said to have beheld the sacrifice." 2nd, Because "it is of a character suited to the unruly habits of the Yádavas, but inconsistent with the Kshatriyas of the Royal house of Bharata, who were scrupulous in the observance of order and law." 3rd, Because "no trace of the custom appears in the ancient ritual of the Rájásúya as preserved in the Aitareya Bráhmaṇa." 4th, Because "the Rájásúya was a ceremony expressive of the superiority of the Rájá who performed the sacrifice", and he could not be expected to honour another. 5th, Because "the custom of offering the *arghya* as a token of respect or act of worship belonged to the Buddhist period, and was essentially a form of worship antagonistic to that of sacrifice." The first argument is founded on a mistake. The sacrifice lasted for a whole year, and it is distinctly mentioned that the guests assembled in the Sacrificial Hall to be present at the imperial baptism when the dispute occurred. The pavilions were so constructed that the princes could, from them, behold the sacrifice going on, but the princes were not there on the occasion in question. The second is a mere assumption. The legends of the Kshatriyas of the house of Bharata show them to have been as unruly as the Yádavas, with whom they were intimately connected by marital and other ties. Besides the very fact of the Kshatriyas of the house of Bharata having been scrupulously observant of order and law, would, in a question of so much importance as precedence, suggest the idea of resenting affronts. The higher the civilization, the more troublesome becomes the settlement of the table of precedence and court etiquette. To Englishmen familiar with the heart-burning which often results even from mistakes in leading persons to the private dinner table, it would not be difficult to conceive how a slight of that description at a grand ceremonial would be calculated to irritate the proud spirit of ancient warriors, and it is well known that the Hindus have always been most punctilious in this respect. Further, if in 1870 of the Christian era, a Kshatriya chief, the Ráná of Jodhpur, could so far carry his recusancy on a question of precedence, as to necessitate his expulsion from British territory within twenty-four hours, it would by no means be unreasonable to suppose that an ancestor of his could commit himself in a similar manner three thousand years ago. The third is due to an oversight; for had the critic looked to the wording

\* History of India, I., p. 171.



of the chapter on the Rājasūya in the Aitariya Brāhmaṇa, he would have found that it does not profess to give the whole of the ritual, but only "the Shastras and Stotras required at the Soma day of the Rājasūya,"\* and its evidence therefore is immaterial. The fourth has arisen from a misapprehension of the real nature of the rite. An emperor doing honour to his guests, does no more thereby lower himself in his majesty than does the father-in-law become inferior to a bridegroom who accepts the position of a son, by offering him an *arghya*. The fifth, like the second, is a mere assumption. There is not a tittle of evidence to show that the Buddhists originated the *arghya* by way of protest to the sacrifices of the Vedas, and there is nothing in the *arghya* decidedly and exclusively characteristic of Buddhism. The Buddhists were not foreigners importing foreign customs and manners, but schismatics who, like the followers of Luther and Wicliffe, rejected all idolatrous, unmeaning, and superstitious rituals and observances, but retained all social rules and customs of their forefathers. Even Piyadasi, the greatest opponent of Hinduism, did not think it inconsistent with his principle to enjoin, in his rock edicts, due respect to Brāhmaṇs. *A priori* it is, therefore, to be supposed that the Buddhists did not reject so innocent a custom as that of offering flowers and incense to a guest. The Hindu-hating Muhammadans adopted it from the Hindus. Besides, the Buddhists do not in the present day offer *arghyas*, and, except in their Tantras, avowedly borrowed from the Hindus, there is no mention of the rite in their ancient books.

To turn however to the Rājasūya of the Pāṇḍavas. The tumult having subsided, the crowning act of the long protracted sacrifice was duly performed. The consecrated water was with all solemnity sprinkled on the newly-created emperor, allegiance was acknowledged by all the guests, and the ceremony was brought to a conclusion amidst the cheers and congratulations of one and all. The guests now dispersed, the chiefs with every mark of honour and consideration, each being accompanied by a brother of Yudhisṭhira to the confines of the Rāj; and the Brāhmaṇs loaded with the most costly gifts.

Mr. Wheeler opines that "the so-called Rājās who really attended the Rājasūya were, in all probability, a rude company of half-naked warriors, who feasted boisterously beneath the shade of trees. Their conversation was very likely confined to their domestic relations, such as the state of their health, of their families, the exploits of their sons, and the marriages of their daughters; or to their domestic circumstances, such as herds of cattle, harvests of grain, and feats of arms against robbers and wild beasts. Their highest ideas were probably simple conceptions of the gods who sent heat and rain; who gave long life, abundance of children, prolific cattle, and brimming harvests; and who occasionally manifested their wrath in light-

\* Haug's Translation, p. 495.



ning and thunder, in devastating tempests and destroying floods. Such, in all probability, was the general character of the festive multitude who sat down upon the grass at the great feast, to eat and drink vigorously to the honour and glory of the new Rájá.\* As a fancy sketch of what a race of primitive savages may be expected to do at a feast this is perfect. From our knowledge of the Juangahs of Western Orissa, of the Santáls of the Kharakpur Hills, and of the Kharwárs of Rohtás, we can easily perceive the natural exactitude of the picture in every line. But those who have read the Mahábhárata in the original, cannot but think that it is not authorised by a single syllable to be met with in that work; and as we have to deal with the account of the feast as given in it, and not what the materials were on which it is founded, the sketch seems somewhat out of place. If we are to resolve the tents (awnings) under which the Bráhmaṇs were lodged, the mansions provided for the royal guests, the assembly hall, the golden seats, the crystal fountains and mirrors, the presents of rich stuffs, horses, golden trappings, and highly prized incenses, the stewards, croupiers, chamberlains, the court etiquette, heralds, and ambassadors, to a motley crowd of "half naked savages feasting under trees, seated on the grass," what is there to prevent our rejecting the whole as a myth?—the baseless fabric of a poet's vision, unworthy of being reckoned as an historic description? Mr. Wheeler attributes them to interpolations made by the Bráhmaṇical priestcraft long after the original of the Mahábhárata had been compiled. Now, the account of the Rájasúya given in that work appears under five heads, omitting the first on consultation which is of no interest. The heads are: 1st, the assassination of Jarásantha; 2nd, the conquest of the four quarters; 3rd, the sacrifice; 4th, the offering of the *arghya*; and 5th, the destruction of Sísupála. Of these the first and the second are, according to the critic, "evidently a myth of the Bráhmaṇical compilers who sought to promulgate the worship of Kṛishṇa." The third, he believes to be, "an extravagant exaggeration" of a feast celebrated by "half-naked savages under the shade of trees"; and the last two, he suspects, are partly borrowed from the Buddhists, and partly from the traditions of the Yádavas, and engrafted on the original story of the Pándavas. Thus, out of the five chapters we have four entirely rejected, and an insignificant residuum of one accepted in a sense which the words of the text do not openly admit. The obvious inference under the circumstances should be that the work in its entirety is a forgery, and not that an original has been tampered with and corrupted. In that case, however, the whole fabric of the learned author's "Ancient India", founded on the Mahábhárata, must fall to the ground.

If nineteen-twentieths of an account are to be rejected, and the remaining twentieth is to be so transmogrified as to be utterly unlike the original,

\* History of India, I, p. 167.



it would be quite misleading to put it forth as a picture of that original. Even if it be true, it would be like the skeleton of Hercules put forth as Hercules in flesh and blood, or an uncarved stone of the Parthenon put forth to represent the character of that renowned work of art. Doubtless, the Pándavas were a primitive people, and twelve hundred years before the Christian era, it would be unreasonable to look, among them, for the refinements of the nineteenth century ; but the question before us is as to what the state of civilization was which they had attained, and to reject the only available evidence in the case, the Mahábhárata, on the *à priori* assumption that, inasmuch as they must have been the counterparts of the Juangahs of our day, they could not have been so civilized as to command houses and tents, or the comforts and conveniences of furniture and clothing, is, to say the least, an unphilosophical mode of argument. To create one's own major, in order to deduce therefrom a foregone conclusion, is not the most logical method for the unravelling of the tangled maze of historical truth. The question, besides, suggests itself, if the Pándavas were really naked savages, what had they to do with the rite of the Rájasúya ? It is impossible to conceive that their circumstances remaining as they are the Juangahs or the Andamanese could think of such a politico-religious rite, and in the case of persons of their condition three thousand years ago, such an idea would be totally unwarrantable. We have the authority of the Aitareya Bráhmaṇa of the Rig Veda, and the Saṁhitás and the Bráhmaṇas of the Black and the White Yajur Vedas, whose antiquity and authenticity are unimpeached, to show that the rite under notice was well known to the Aryans from a very remote period of antiquity, and the description given in those works of the rite and its requirements, indicates that the social and political condition of their authors was considerably more advanced than those of men who have no higher conception of a solemn religious rite than entering into a drinking bout, seated on the grass under the shade of trees. The Pándavas, if such a family ever lived, must have lived either before the date of the Vedas, or after it. In the former case, they could not have performed the ceremony, for the ceremony had not been then designed. If the latter, they must have known the Vedic ordinances, and been in a condition to follow them. And in either case the theory of naked savages feasting under the shade of trees to celebrate the rite in question must be given up as untenable. The story of the Pándavas may, for aught we know to the contrary, be all a myth, even as that of the Iliad founded, as supposed by some, on an allegory of the Dawn chased by the rising sun ; but as in the latter case the Iliad must be accepted as a history of the inner life of men and manners in the earliest days of the Greeks, so must the Mahábhárata be accepted as a record of the life of the Aryans in India a few centuries before the time when the Iliad was composed ; and in the account of the



Rájásúya we cannot help accepting a picture of what at least was the ideal of such a rite in those days.

The Mahábhárata does not give any sample of the conversations of the assembled guests at the Rájásúya. The Bráhmaṇas are said to have discoursed about the particular forms in which certain ceremonies had to be performed, but the *ipsissima verba* of their discourses are not given. The speeches of Śiśupála, denouncing the claim of Kṛishṇa to the *arghya*, are fluent and fiery, though not quite so elevated in tone as some of the Homeric speeches are; but such as they are, we cannot gather from them any idea of the common topics of private conversation of the guests. It is probable, however, that Mr. Wheeler is perfectly right in his guess about them. Warriors in olden times were rarely noted for their literary acquirements or polish, and some roughness was inseparable from them even in Europe two hundred years ago; and the private conversation of such men could not take a very lofty tone. It is extremely doubtful if at Versailles during the coronation of Emperor William, the guests among themselves discussed on transcendental philosophy. Certain it is that even in our own day a little less of sensational talk and private scandal at tea parties and private gatherings would be a positive gain to society. Anyhow under no circumstance can the staple of private conversation among particular groups of men help us to any exact idea of the social and intellectual condition of a whole race or tribe.

As to the ideas of the Páṇḍavas regarding the Divinity, some of the mantras quoted below will, we think, be found to be much more reliable guides, than any guesses based on *à priori* arguments.

The rituals of the Rájásúya do not appear in the Mahábhárata even in a brief summary. It did not fall within the scope of that work—an avowedly epic poem—to dwell upon so dry and recondite a subject; nor is there, as already stated, any single treatise or guide-book extant in which the whole of the details may be found arranged consecutively. The Saṁhitá of the Rig Veda, which supplies some of the principal mantras of the rite, has nowhere used the word Rájásúya. The Sáma is equally silent, and so is the Atharva. One of the Bráhmaṇas of the Rig Veda, the Aitareya, however, devotes an entire book to the rites of the last day of the sacrifice on which the king is made to sit on a throne, consecrated with holy water, driven in a chariot, and offered a goblet each of the *Soma* beer and arrack; and also specifies a few of the hymns which are to be recited in connexion with some of the different ceremonials and offerings which make them up. The only subject which it describes at any length is the *abhisheka*, or the pouring of consecrated water on the king and its attendant rites. The Saṁhitá of the Mádhyandini Sákhá of the White Yajush treats of the subject at a greater length, and supplies most of the mantras required; but the mantras occur dispersed under different heads. The Taittiriya Saṁhitá of the Black Yajush and its



corresponding Bráhmaṇa, however, make ample amends for the shortcomings of the others. They treat of the rite in nearly its entirety from the beginning to the end, and supply by direct citations or references all the mantras required to be muttered while making the various offerings to the fire, and those which should precede, or follow, the offerings, as also those which are required for bathing, drinking, mounting a car, and other formalities and ceremonies which have to be gone through. They are silent, however, as to the particular stages of the rite when the Rig mantras are to be repeated, and the Sáma hymns to be chanted, and these we know from other sources are inseparable from the rites prescribed by the Yajur Veda. The details, too, as given are insufferably tedious and puerile in some respects, and vexatiously obscure and unintelligible in others. Instructions are also wanting as to how often the rites are to be repeated, and how the time over which they spread is to be filled up.

It appears that the Rájasúya, as a religious sacrifice, was not a distinct and independent ceremony, but a collection of several separate rites celebrated consecutively, according to a given order, and spreading over a period of twelve months. It required the services of several priests, and unlimited supplies of butter, rice, sacrificial animals, *Soma* wine, and other articles appropriate for a Yajña, as also frequent and heavy presents of gold and kine to the priests and Bráhmaṇas.

The time allotted to the preliminary rites was divided into three equal periods, each of which bore a separate name, and during each a particular round of ceremonies had to be gone through. From the number of months included in each of the three periods its most appropriate name would be a *Cháturmásya*, or a 'quadrimestrial rite'; but the name, it seems, did not originate merely from the fact of there being four months in each period, but from the circumstance of the time being devoted to the performance of a sacrificial rite of that name prescribed in the Vedas. It commenced usually when the 14th and the 15th of the waxing moon of the month of Phálguṇa, (February—March) came into conjunction; but in the event of an accident on that day the new moon of the month of Chaitra (March—April) was deemed the next best, and offerings were made, at morning, noon and evening, regularly every day for four lunar months; the Darśa and the Púrṇamása rites being celebrated alternately on the successive new and full moons, and the Prayujá rite on every full moon. The Cháturmásya was ordained for both Bráhmaṇas and Kshatriyas, and was held in great veneration. When the Buddhist set aside the old Vedic rites, they could not altogether reject the Cháturmásya, so they retained the name, but changed its character. Instead of in March, they commenced the rite at about the end of June, or early in July; and in lieu of offerings to the fire, they took to systematic and formal reading of their scriptures. The rains



rendered travelling and itinerary mendicancy inconvenient, and shelter under the roof of a hermitage, or monastery, was an absolute necessity; and the period of this confinement was, therefore, the best adapted for reading and particular forms of penance. From the circumstance of the ceremony being observed in the rainy weather, it had the alternative name of *Wassá* or "the autumnal rite." When Hinduism revived, the Cháturmásya could not be conveniently sent back to the season when it was originally celebrated, so in the modern calender it begins on the 11th of the waning moon in Śrávaṇa (July), and terminates on the 11th of the waxing moon in Kártika, (October—November); though the ceremony is not finally closed until the full moon following. Women and hermits are the principal observers of this ceremony in the present day, and it is made up of a series of fasts and penances: some abstaining from the evening meal, or rice altogether; some taking their food served on the bare ground; some giving up the use of bedsteads; others eschewing the use of betel leaf, condiments and rich food of all kinds. Abstinence from flesh meat and fish, from fine clothing, and from indulgence in singing, dancing, and music are obligatory on all. In some of its features the new rite bears a close resemblance to the Lent of the Christian Church, and, curiously enough, its old prototype, the Vedic rite, commenced at about the same time.

The sacrifice opened with the cooking of eight pots of frumenty for a divinity named Anumiti, who, according to some, is the presiding spirit of the interval between the 14th and the 15th lunation, but, in the opinion of others, that of fertile land. The frumenty being duly consecrated and offered, a fee of one milch cow was to be given to the priest. The object of this offering was to pacify the earth and make her agreeable and favourably disposed to the sacrifice. Then followed an offering of one potful of frumenty to Nirṛiti, the personation of barren land, or the evil genius which causes mischief and interruptions to the progress of the rite. The fee (*Dakshiná*) for this offering was a piece of black cloth with a black fringe; and this offering had to be made while standing at the doorway, so as to protect the sacrificial hall from her encroachment. Offerings next followed to Āditya, Vishṇu, Agni, Indra, Soma, and Sarasvatí, to each a specific number of platters of the frumenty, and an appropriate fee for the priest who consecrated those offerings on the fire. The fee varied from a bit of gold to a calf, a bull, or one or two milch cows. The full-moon rite, Púrṇamása, was then performed with offerings of *Soma* beer and animal sacrifice as ordained under that head in the Vedas.

After this preliminary homa, the rites proper of the first Cháturmásya, which bore the specific name of *Vaiśvadeva Parva*, began. These included a daily round of offerings, morning, noon, and evening, the articles offered being mostly clarified butter and frumenty cooked with grains



of various kinds, not excepting several species of wild grass, the seeds of which, though now no longer thought of as edible, seem to have been prized not only as articles fit for presentation to the gods but as nutritious food. The mantras of course differed for every separate offering, and the ritual was very scrupulously fixed for the morning, noon, and evening observances; but for the successive days there was little or no change, except on the successive new and full moons when the Darśa and the Pūrṇamāsa were celebrated with the usual offerings of *Soma* beer, and the priests and their congregations regaled themselves with the intoxicating beverage. One of the mantras from the Black Yajur Brāhmaṇa contains a curious reference to an iron instrument put inside the mouth for governing and guiding horses. This completely refutes the accuracy of the statement made by Arrian that the Indians at the time of Alexander's invasion knew not the use of the bit or snaffle, and tied a piece of raw bullock's hide round the lower part of the horse's jaw.\* The name for the bit or snaffle in the olden days was *ādhāna*.† Subsequently the word *khalina* was substituted.

The second period of four months bore the name of *Varuṇa-praghāsa Parva*. It commenced in the month of Āśādhā (June—July), or Śrāvaṇa (July—August), according as the first period commenced in Phālguaṇa or Chaitra. The articles of offering during this period included, besides the frumenty, grains, clarified butter, &c., an occasional allowance of mutton. The arrangement of the altars was slightly changed, and the mantras used were mostly different, but the gods invoked were the same, and the alternate celebration of the Darśa and the Pūrṇamāsa rites, as also of the Prayujā, was regularly continued.

The third period opened with the performance of a group of rites called the *Sākamedha Parva*, which took up two days, the first devoted to three homas, and the second to nine homas, and three offerings to the manes—*Mahāpitṛi yajña*. The homas of the second day were designed for the Maruts. It is said that “Indra having destroyed Vritra, ran away, thinking that he had done wrong. (Meeting the Maruts in the way) he asked, ‘Who can ascertain this (whether I have killed Vritra or not)?’ The Maruts replied, ‘We shall give you the blessing, and ascertain the fact; do you give us the first oblation.’ They then played about (on the corpse of Vritra and were satisfied that it was lifeless). Hence the play of players, and therefore are the oblations first given to the Maruts for success in warfare.” The details of the offering to the manes were very much like what is well known in connexion with the ordinary śrāddhas, but the mantras were different, and the rite was looked upon with special veneration.

\* Vide Mitra's *Antiquities of Orissa*, I. p. 128.

† अक्षामे वा इन्द्रस्य हरी सोमपातौ । तयोः परिधेय आधानं । हरी अथौ तयो-  
र्वशीकरणाय मुखे प्रविष्टो लोहविशेष आधानं । Black Yajur Saṁhitā, II. p. 27.



It was followed, on a subsequent day, by another feast for the manes, and it was called *Tryambaka Purodāsa*. In this the spirit of each ancestor had a separate platter of cake or ball of barley steeped in ghí, and an extra one was designed for those who would ascend the region of the Manes (Pitris) at a future time. The balls of course, as usual in śráddhas, were consecrated, but not put on the ground. They were thrown upwards and received back on the palm of the hand. The divinity invoked afterwards was Rudra, who is described as a cruel god, with three eyes—*tri* 'three,' and *ambaka* 'eyes,' whence the name of the rite. Ambá is referred to as the wife of the god. The object of the rite seems to have been the prevention of the destruction of crops by vermin, through the pacification of their lord, who is described as the "master of rats."\* To the modern Indian reader, this passage will appear remarkable, as it is universally known in the present day, as it was in those of the Purāṇas, that the rat was the favourite of Gaṇéśa, the son of Rudra, and not of Rudra himself. There is, however, no contradiction, as the vehicle of the son may well be a favourite of the father. As during the two preceding periods, so in this, the Darśa, the Púrṇamāsa and the Prayujá rites were celebrated with a lavish consumption of *Soma* beer, but in the absence of a manual I cannot ascertain if the Homas and the Śráddhas were repeated every fortnight: (apparently they were,) and how the other days of the period were occupied. The Sastras and Sáma hymns of this period are also unknown to me.

On the completion of the three quadrimensial rites extending over a period of one year, four separate rites were enjoined for the first day of the new year. The first of these was called *Súnasírya*, and it included offerings of twelve platters of frumenty to Indra and Agni; one platterful of the same to the Viśvedevás, twelve platters of cakes to Indra as a combination of *Súná* 'wind,' and *Síra* 'the sun,' milk to Váyu, and one platterful to Súrya. The fee to the priest for the rite was twelve heads of kine.

The next was called *Indra túrya* or "Indra the fourth," the other three associates being Agni, Rudra, and Varuṇa. It included offerings of eight plattersful of frumenty to Agni, a platterful of the same made of a kind of wild paddy, called *Gávidhuka*, to Rudra, curdled milk to Indra, and frumenty made of barley to Varuṇa. The fee for this rite was a cow fit to carry loads.

The third rite, called *Pañchedhmíya*, was performed at night, when five loads of different kinds of wood were offered to the fire along with clarified butter. The object of this rite was to prevent Rákshasas from causing interruptions. The last rite was called *Apámarga Homa*, because it was accomplished by offering, at early dawn, a handful of meal made of the seeds of a wild weed named *Apámarga*, (*Acheranthes aspra*) on a burning fagot.

\* आखुले रद्र । Commentary हे रद्र मूयकले प्रियः पशुः ।



The story in connexion with this rite says ; “ once on a time Indra, having destroyed Vritra and other Aśuras, failed to find out the Aśura Namuchi. At last he seized him, and the two wrestled together ; Indra was overpowered, and on the point of being killed ; when the Aśura told him, ‘ Let us enter into an agreement for peace, and I shall let you alone ; promise only that you will not attempt to kill me with a dry or a fluid substance, nor during day nor at night.’ (The agreement was accordingly ratified, but Indra was not satisfied.) He collected some foam, which was neither dry nor moist, and, at dawn, when the sun had not risen, which was neither day nor night in this region, struck the head of the Aśura with that foam. The Aśura complained that he (Indra) was a murderer of his friend. From the head (of the Aśura) was produced the herb Apámarga. Performing a homa with that herb, he (Indra) destroyed the Rákshasas.”\*

For the day following six rites were enjoined, including offerings to some of the minor deities who protect infants from their conception to the time when they learn to speak. The articles offered call for no remark. The fee in four cases was one or more cows of particular colour or quality, gold in one, and a horse in the last.

The rites aforesaid were all performed in the king’s own sacrificial hall, where the necessary altars were prepared for the purpose. But after the last-named rite, some offerings had to be made on successive days in the houses of his subjects, and they were collectively called *Raterindm Havi* or “ the rite of the wealthy.” The first offering was made to Vṛishaspati in the house of the High Priest Brahmá ; the second to Indra, in the house of a Kshatriyā ; the third to Aditya, in the house of the anointed Queen ; the fourth to Nirriti, in that of the queen who is not a favourite ; the fifth to Agni, in that of the Commander-in-Chief ; the sixth to Varuṇa, in that of the charioteer ; the seventh to the Maruts, in that of a public prostitute ; the eighth to Savitá, in that of the chamberlain or warder of the gymnasium ; the ninth to the Ásvins, in that of the treasurer ; the tenth to Pushan, in that of the ryot who shares the produce with the king ; the eleventh to Rudra, in that of a gambler. Each of these offerings had its appropriate fee. On the completion of these, two other rites, respectively called Dikshaniya and Devasuvá, had to be performed in the king’s own sacrificial hall. They occupied one day, and completed the preliminary rites necessary for the most important act of the sacrifice—the Imperial bathing or *Abhisheka*.

The account of the *Abhisheka* given in the White Yajur Bráhmaṇa is nearly as full as that which occurs in the Black Yajur, but the Bráhmaṇa of the latter which elaborates it is, at every step, interrupted by innumerable little stories of no interest.

\* Taittirya Saṁhitá, Vol. II. p. 95.



The religious rites performed on the last day of the great sacrifice were twofold—one appertaining to the celebration of an ephemeral (*aikāhika*) *Soma* sacrifice with its morning, noon and evening libations, its animal sacrifices, its numerous Shastras and Stotras, and its chorus of Sāma hymns, and the other relating to the bathing and its attendant acts of mounting a car, symbolically conquering the whole earth, receiving the homage of the priests, and quaffing a goblet of *Soma* beer and another of arrack, together with the rites appertaining thereto.

The proper time for the ceremony was the new moon after the full moon of Phālguna, *i. e.*, at about the end of March. The fluids required for the bathing were of seventeen kinds according to the Mādhyandiniya school of the White Yajush, and “sixteen or seventeen” according to the Taittiriya-kas. The former, however, gives a list of 18 kinds\* ; thus—1st, the water

\* The discrepancy is explained by taking the Sārasvatī water to be the principal ingredient, and the others the regular ritual articles. For the Abhisheka of Vaishnavite idols of wood, stone or metal, recommended by later rituals, the articles required are considerably more numerous, but they do not include all those which the Vedas give above. Thus, they enumerate, 1st, clarified butter ; 2nd, curds ; 3rd, milk ; 4th, cow-dung ; 5th, cow's urine ; 6th, ashes of bull's dung ; 7th, honey ; 8th, sugar ; 9th, Ganges water or any pure water ; 10th, water of a river which has a masculine name ; 11th, water of a river which has a feminine name ; 12th, ocean water ; 13th, water from a waterfall ; 14th, water from clouds ; 15th, water from a sacred pool ; 16th, water in which some fruits have been steeped ; 17th, water in which five kinds of astringent leaves have been steeped ; 18th, hot water ; 19th, water dripping from a vessel having a thousand holes in its bottom ; 20th, water from a jar having some mango leaves in it ; 21st, water from eight pitchers ; 22nd, water in which kusa grass has been steeped ; 23rd, water from a jar used in sprinkling holy water (*sāntikumbha*) ; 24th, sandal-wood water ; 25th, water scented with fragrant flowers ; 26th, water scented with fried grains ; 27th, water scented with Jaṭāmansi and other aromatics ; 28th, water scented with certain drugs collectively called Māhaushadhi ; 29th, water in which five kinds of precious stones have been dipped ; 30th, earth from the bed of the Ganges ; 31st, earth dug out by the tusk of an elephant ; 32nd, earth from a mountain ; 33rd, earth from the hoof of a horse ; 34th, earth from around the root of a lotus ; 35th, earth from a mound made by white-ants ; 36th, sand from the bed of a river ; 37th, earth from the point where two rivers meet ; 38th, earth from a boar's lair ; 39th, earth from the opposite banks of a river ; 40th, cake of pressed sesamum seed ; 41st, leaves of the aśvattha ; 42nd, mango leaves ; 43rd, leaves of the Mimosa arjuna ; 44th, leaves of a particular variety of aśvattha ; 45th, flowers of the Champaka ; 46th, blossoms of the mango ; 47th, flowers of the Sami ; 48th, Kunda flowers ; 49th, lotus flower ; 50th, oleander flowers ; 51st, Nagakesara flowers ; 52nd, Tulsi leaves powdered ; 53rd, Bel leaves powdered ; 54th, leaves of the kunda ; 55th, Barley meal ; 56th, meal of the Nivāra grain (a wild paddy) ; 57th, Powdered sesamum seed, 58th, powder of Sati leaves, 59th, turmeric powder, 60th, meal of the Syāmāka grain, 61st, powdered ginger, 62nd, powder of Priyangu seeds ; 63rd, rice meal ; 64th, powder of Bel leaves ; 65th, powder of the leaves of the Amblic myrobalan ; 66th, meal of the kangni seed. The usual practice is to place a mirror before the idol, then to fill a small pitcher with pure



of the Sarasvatī river, (*Sārasvatī*) ; 2nd, water from a pool or river while in a state of agitation from the fall of something into it, (*Kallola*) ; 3rd, water disturbed by the passage of an army over a ford (*Vrisasenā*) ; 4th, water taken during an ebb tide, (*Arthetā*) ; 5th, water taken during a flood tide (*Ojashvatī*) ; 6th, water from the point of junction of two streams produced by a sandbank in a river (*Parivāhīnī*) ; 7th, sea-water (*Apāmpatī*) ; 8th, water from a whirlpool (*Apāngarbhā*) ; 9th, water from a pool in a river where there is no current, (*Sūryatvak*) ; 10th, rain water which falls during sunshine, (*Sūryavarchhas*) ; 11th, tank water (*Māndā*) ; 12th, well-water, (*Vrajakshitā*) ; 13th, dew-drops collected from the tops of grass blades, (*Vāśā*) ; 14th, honey (*Savishthā*) ; 15th, liquor amnion, (*S'akvari*) ; 16th, milk (*Janabhrit*) ; 17th, clarified butter, (*Viśvabhrit*) ; 18th, water heated by exposure to the sun, (*Svarāt*.) These waters were collected at proper seasons and opportunities, and kept in reserve in pitchers near the northern altar. On the day of the ceremony eighteen small vessels made of the wood of the *Ficus glomerata* (*Udumbara*) or of the *Calamus rotang* (*vetasa*) were provided, and the Adhvaryu, proceeding to the first pitcher, drew some water from it into one of the vessels while repeating the mantra, "O honeyed water whom the Devas collected, thou mighty one, thou begotten of kings, thou enliverer ; with thee Mitra and Varuṇa were consecrated, and Indra was freed from his enemies ; I take thee." He next drew some water from the second pitcher, with the mantra "O water, thou art naturally a giver of kingdoms, grant a kingdom to my Yajamāna so and so (naming the king)", and then poured into the vessel butter taken four times in a ladle, a mantra being repeated to consecrate the operation of pouring. In this way all the eighteen vessels being filled and consecrated in due form, their contents were all poured into a large bucket made of the same wood, while repeating the verse, "O honeyed and divine ones, mix with each other for the promotion of the strength and royal vigour of our Yajamāna." The mixture was then removed to the altar opposite the place of Mitravaruṇa. The bucket being thus placed, six offerings were made to the six divinities, Agni, Soma, Savitā, Sarasvatī, Pushā, and Vrihaspatī. Two slips of Kusa grass were next taken up, a bit of gold was tied to each, and the slips thus prepared were then dipped into the bucket, and a little water was taken out with them, and sprinkled on the king while

water, drop in it a small quantity of one of the articles in the order above named, and lastly to pour the mixture on the reflected image, through a rosehead called śata-jhārā, similar to the gold vessel with a hundred perforations described above. This symbolical bathing is found expedient to prevent the paint, and polish of the idols being soiled and tarnished. In the case of unbaked idols the necessity for it is imperative, and the bathing is more simple, summary and expeditious.



repeating the mantra, "I sprinkle this by order of Savitá, with a faultless thread of grass (*pavitra*)—with the light of the sun. You are, O waters, unassailable, the friends of speech, born of heat, the giver of Soma, and the sanctified by mantra, do ye grant a kingdom (to our Yajamána.)"

Four buckets were next brought out, one made of Palása wood, (*Butea frondosa*) one of Udumbara (*Ficus glomerata*), one of Vaṭa (*Ficus indica*), and one of Ásvattha (*Ficus religiosa*), and the collected waters in the bucket were divided into four parts, and poured into them.

The king was then made to put on his bathing dress, consisting of an inner garment for the loins (*tárpya*) made of linen or cotton cloth steeped in clarified butter, a red blanket for the body (*Paṇḍya*), an outer wrapper tied round the neck like a barber's sheet (*adhivása*), and a turban (*ushnísá*). A bow was then brought forth, duly strung, and then handed to the king, along with three kinds of arrows, for all which appropriate mantras are provided.

The Adhvaryu then, taking the right hand of the king, repeated the two following mantras: (1st) May Savitá appoint you as the sovereign of the people. May Agni, the adored of householders, appoint you the ruler of all householders. May Soma, the sovereign of the vegetable kingdom, grant you supremacy over vegetables. May Vrihaspati, the developer of speech, bestow on you power over speech. May Indra, the eldest, make you the eldest over all. May Rudra, the lord of animals, make you supreme over all animals. May truthful Mitra make you the protector of truth. May Varuṇa, the defender of virtuous actions, grant you lordship over virtue." (2nd). "O well-worshipped gods, Do you free so and so (naming the king), the son of so and so (naming the father and mother of the king), from all enemies, and enable him to be worthy of the highest duties of Kshatriyas, of the eldest, of the lord of vehicles, and of supremacy. Through your blessings he has become the king of such a nation (naming it). O ye persons of that nation, from this day, he is your king. Of us Bráhmaṇs, Soma is the king." The concluding line of the last mantra is worthy of note, as it exempts the Bráhmaṇs from the sovereignty of the anointed king.

A few offerings to the fire next followed, and the king was then made emblematically to conquer the four quarters of the earth and the sky. Making him advance successively towards the east, north, south, and west, the Adhvaryu said, "Yajamána, conquer the earth. May the metre Gáyatri, the Ráthántara Sáma hymn, the Stoma named Trivit, the spring season and the Bráhmaṇ caste protect you on this side." "Yajamána, conquer the south. May the metre Trisṭup, the Brihat Sáma hymn, the fifteen-fold Stoma, the summer season and the Kshatriya caste protect you there." "Yajamána, conquer the west. May the metre Jagati, the Vairupa Sáma hymns, the seventeen-fold Stoma, the rainy season and the Vaiśya caste protect



you there." "Yajamāna, conquer the north. May the metre Anusṭup, the Vairāja Sāma hymns, the twenty-one-fold Stoma, the Autumn season, and the fruits of the earth protect you there." The king was then made to look upwards, and while he did so, the Adhvaryu recited a mantra saying, "Yajamāna, conquer the upper regions. May the metre Pañkti, the Sakvara and the Raivata Sāma hymns, the three-fold-nine and the thirty-three-fold Stomas, the dewy and the cold seasons, Vigour and Dravina wealth protect you there."

A stool, made of the wood of the *Mimosa catechu* (*Khadira*) or of the *Ficus glomerata*, having feet about seven inches high, had next to be provided, and thereon was spread a tiger skin with the hairy side upwards and the head looking to the south, the mantra for the purpose saying, that even as the skin was the glory of the moon so should it confer glory on the king. On the skin was placed a *Satamāna*, a bit of gold of the weight of a hundred measures,\* or a coin of that name—probably the latter. Seated on this bathing stool facing the east, the king had a vessel of gold, weighing a *Satamāna* and having nine or a hundred perforations in its bottom, placed on his head. A piece of copper was also placed under his left foot, and a piece of lead under his right foot. The vessel was intended to serve as a rose-head for the fluid for the bathing falling in a shower over the head of the king; the copper as the emblem of the head of Namuchi, the chief of the Asuras or Demons, who were inimical to religious rites, and the lead that of tatlers and wicked people who had to be put down. The mantras intended to be recited when placing the three articles indicate their character. The king recited the mantras, and then kicked away the metals from under his feet. After this, he lifted his two hands upwards, repeating appropriate mantras, in one of which he promised to rise before the sun every day, and remained in that position. Thereupon, the Adhvaryu came forward and stood in front of him with the bucket made of Palāsa wood in his hand. The High Priest or a relative of the king stood on the right side with the bucket of Udumbara wood, and a Kshatriya on the left with the bucket made of Nyagrodha wood, while a Vaiśya stood behind with the bucket made of Aśvattha wood, and each on his turn, in the order named, poured the contents of his bucket on the king's head. The mantra to be recited when about to pour the water runs thus: "May king Soma and Varuṇa and the other

\* The Scholiast takes the *Satamāna* to be equivalent to a hundred *krishṇalas* or *ratis*; which would be equal to 175 Troy grains; but the researches of the learned Mr. Thomas clearly prove that the *māna* was nearly treble the weight of the *rati*, and that the *Satamāna* was equivalent to 320 *ratis* or 560 Troy grains, which made it equal to four of the well-known old coin *Suvarṇa*, which weighed 140 grains Troy—something like the Greek Tetradrachma, but about twice its weight, and of gold. Marsden's *Numismata Orientalia*, New Ed., p. 5.



gods who are the defenders of religion protect thy speech ; may they protect thy vital airs ; may they protect thy eyes ; may they protect thy ears." The mantra for the Adhvaryu when pouring the water from his bucket, says, " O Yajamāna, I bathe thee with the glory of the moon ; may you be king of kings among kings ; may you prosper in every way ; may you overcome all your enemies. O ye well worshipped Devas, may you free so and so (here the name of the king) the son of so and so (here the names of his father and mother) from all his enemies, and enable him to discharge the highest duties of the Kshatriya, of the eldest, of the owner of the best vehicles, and of his own greatness. Through your blessings he has become the king of such a nation (name). Know ye of that nation, that he has this day become your king. Of us, Bráhmaṇas, Soma is the king." For the Brahmá the mantra is similar to the last, substituting only " the glory of Agni," for that of the moon, and omitting the names. The Vaisya appealed to the glory of God, and the Kshatriya the light of the sun.

The baptism over, the Emperor descended from his seat, cast off his wet clothes, put on his regal dress including hogskin shoes, and then took three steps forward, symbolically to represent the subjugation of the three regions, repeating for each act a separate mantra. The three steps were the counterparts of those by which Vishnu spanned the earth, the upper regions and heaven, or those of the sun at sunrise, midday and sunset. The Adhvaryu in the meantime offered an oblation to the fire, and the Agnidhra, collecting a portion of the water that had run over the Emperor's person, poured a portion of it on the fire in the name of Rudra.

A chariot was next brought into the sacrificial hall, and to it three horses were yoked, and two charioteers were made to take their places on its two sides. The White Yajush recommends four horses. The Emperor, having taken his seat, ordered the charioteers to proceed, and they whipped the horses, and drove them on until the vehicle was brought in front of a herd of cattle, when the Emperor touched the foremost cow with the top of his bow, the operation being emblematic of a successful cattle-lifting raid. The vehicle was then turned and brought back to its place near the altar, when the Adhvaryu offered four oblations to the fire, in the names of Agni, Soma, Maruts and Indra, and the Emperor, while descending from his chariot, recited a mantra, saying, " Him who is the pure soul, (Hañsa), Him, who is the pervader of the ether, Him, who presides as the Hotá at the altar, Him who is the long-travelled guest, Him, who, born of water, reigns in every human form, Him who enlivens all animals, Him who controls the seasons, Him who sustains the mountains, Him, the all-pervading and the mighty one, I adore." Having descended from the car, he touched the two *Satamānas* which had been previously attached to the two wheels of the vehicle.



A proper throne with a leather cushion was next prepared, and the Emperor, having taken his seat thereon, received the homage of his guests. The first person to approach him was the Adhvaryu, who, touching his breast, said, "If you desire to govern an empire, judge impartially between the great and the small; direct your entire attention to promote the prosperity of all; and exert your utmost to prevent all misadventure."

The Brahmá or High Priest next appeared before him and the following conversation passed between them.

The Emperor. "Bráhmaṇ."

Brahmá. "Thou art all-glorious. Thy behests can never be overruled. Thou art the asylum of the people, and therefore (as great as) Savitá."

Emperor "Bráhmaṇ."

Brahmá. "Thou art all-glorious. Thy might is infallible. Thou art the asylum of the people, and therefore (as great as) Varuṇa."

Emperor "Bráhmaṇ."

Brahmá. "Thou art all-glorious and the owner of every kind of wealth. Thou art the preserver of the peace of the country, and therefore Indra."

Emperor "Bráhmaṇ."

Brahmá. "Thou art all-glorious, the adored of all to whom thou art kind, and the cause of weeping to the women of your enemies, and therefore Rudra."

Emperor "Bráhmaṇ."

Brahmá. "Thou art all glorious, therefore like unto Brahmá."

The Purohit was next commanded to approach, and he handed the Emperor a sacrificial knife. This knife was made of hard wood, and in shape like a scymitar. With the point of this instrument, the Emperor had to draw on the ground a dice-board, and, offer thereon four oblations with butter to Agni. This done, the Adhvaryu handed over to him five dice, shaped like couris, made of gold, and these he cast on the board, saying, "O Ye dice which have been taken up after the offering of due oblations, do ye, mixing with the fierce rays of the sun, grant me supremacy among kings." If the dice when cast showed the full number on the upper surface, the augury was believed to be satisfactory.

After this augury the allies, tributaries, vassals and other guests offered their congratulations and homage; but as this was done without any mantra, no mention of it occurs in the ritual.

Now followed a rite called *Saṁsrīpa Havi*, and it required eight plattersful of butter for Agni, frumenty for Sarasvatí, and twelve plattersful of butter for Savitá, the offering to each divinity being accompanied by an appropriate fee.

Next came the rite called *Daśapeya*. Preparations for it were made previously, and they included the purchase and expression of the juice of



the Soma vine, and the brewing of the same into beer. Immediately after the performance of the last named rite, a series of offerings were made to the fire with this beer, and then a cupful of it was offered to the Emperor, who quaffed it after repeating a mantra. He then presented largesses to all the officiating priests, including two golden mirrors to the Adhvaryu, a golden necklace and his own outer garment to the Udgátá, golden bracelets to the Hotá, a horse to the Prastotá and the Pritihartá, twelve heads of pregnant young heifers to the Brahmá, a barren cow to the Mitrávaruṇa, a vigorous bull to the Brahmanachhañsi, clothes to the Neṣṭri and Potri, a cart loaded with barley to the Achchháváka, and a bullock to the Agnidhra.

Next followed certain offerings of butter, curds and frumenty to Agni, Indra, Viśvedeváh, Mitra, Varuṇa, and Vrihaspati, and the sacrifice of a pregnant goat having well developed teats under the neck to Aditya, and that of a pregnant heifer to the Maruts.

The last rite in this long list of ceremonies and sacrifices was called *Sautrámaṇi*, or the offering of rice spirit. Preparations for it were made from three days previously, when young dried dates (*kṛala*), small round plums (*vadari*), and myrobalans (*haritaki*) were brought, carefully cleaned, deprived of their stalks and calyces, and powdered, then three kinds of the fur—of the lion, the tiger and the wolf—were mixed with the powders, along with barley meal, yeast and tender blades of durba grass, and allowed to ferment in a large vessel of water. When the fermentation was complete, the liquor was strained and preserved for use. After the performance of the rite named in the last preceding para., a brown goat and a bull were sacrificed, and offerings were made with this liquor, as also with butter and frumenty, and the ceremony was closed by the Emperor quaffing a gobletful of the exhilarating liquor.

The rituals given in the Black and the White Yajush thus limit the Abhisheka to one sprinkling and one bathing; but the Aitareya Bráhmaṇa of the Rig Veda recommends three kinds of bathing: 1st, called *Abhisheka* for kings; 2nd, *Purnábhishheka* for superior kings, and 3rd, *Mahábhishheka* for emperors. Its details are different, but from the mantras given, the second bathing appears to correspond to a great extent with the ritual above given. The object of the third is thus described: "The priest who, with this knowledge (about the *Mahábhishheka* ceremony as described in a preceding part of the work) wishes that a Kshatriya should conquer in all the various ways of conquest, to subjugate all people, and that he should attain to leadership, precedence and supremacy over all kings, and attain everywhere and at all times to universal sovereignty, enjoyment (of pleasures), independence, distinguished distinction as a king, the fulfilment of the highest desires, the position of a king, of a great king, and supreme mastership, that he might cross (with his arms) the universe, and become the ruler of the whole earth



during all his life, which may last for an infinitely long time, that he might be the sole king of the earth up to its shores bordering on the ocean; such a priest should inaugurate the Kshatriya with Indra's great inauguration ceremony."\* Such a blessing, however was not easily granted. Before granting it, the priest was required to demand from the king the following in the form of an oath: "Whatever pious works thou mightest have done during the time which may elapse from the day of thy birth to the day of thy death, all these together with thy position, thy good deeds, thy life, thy children, I would wrest from thee shouldst thou do me any harm."†

The utensils required for the ceremony were very much the same as noticed before, but the fluid for the bathing instead of including eighteen kinds of water and other substances, comprised only four kinds of fruit powdered, curds, honey, clarified butter and rain-water fallen during sunshine, all mixed in a bucket of Udumbara wood. The mixture was too repulsive to be poured over the head, and so it was used only for sprinkling over the person of the king. The drinking of the Soma beer and spirituous liquor then followed, for the latter of which the following mantras are given: "Of what juice well-prepared beverage Indra drank with his associates, just the same, viz. king Soma, I drink here with my mind being devoted to him." "To thee who growest like a bullock (Indra) by drinking Soma, I send off (the Soma juice) which was squeezed to drink it; may it satiate thee and make thee well drunk."‡

The effect of the drinking is thus described by the author of the Bráhmaṇa: "The drinking of spirituous liquor, or Soma, or the enjoyment of some other exquisite food, affects the body of the Kshatriya who is inaugurated by means of Indra's great inauguration ceremony, just as pleasantly and agreeably till it falls down, as the son feels such an excess of joy when embracing his father, or the wife when embracing her husband, as to lose all self-command."§

It is no where stated whether the whole or only a part of the ceremonies above described was observed by Yudhishṭhira. Each school of Vedic priests having had their own separate system of ritual, it is to be presumed that Yudhishṭhira must have followed one of them, and consequently omitted some details. It is not known to which school his family priest Dhaumya belonged, but the school of the client must have been the same as that of the priest.

\* Haug's Translation, p. 519. † Loc. cit. ‡ Ibid., p. 522. § Ibid., p. 523.





# INDEX

TO

JOURNAL, ASIATIC SOCIETY OF BENGAL, PART I,

FOR

1876.

**ABHAN**, Rájpáts, 303  
 Abhishekha, or rite of bathing the Emperor, 390  
 Achín, supplies sulphur, 70  
*ádhána*, or bit for horses, 388  
*agni-aster*, a Sanskrit fire-arm, 44, 45  
 Ahírs, in Audh, 302  
 Ahmad Sháh Bahmaní, coin of, 296  
 Ahmad Sháh, ruler of Skardú, 119  
 Aibak, Kutb-uddín, 334  
 Aish, a frontier village in Gilgit, 136  
 Aitareya Bráhmaṇa, mentions human sacrifices, 118  
*ákaras*, modes of birth, 9n.  
 Akbar, coin of, 292  
 Alláhábád, the ancient Várapávratá, 371  
 Alor, battle of, 39  
 Amba, wife of Rudra, 389  
 Americans, human sacrifices of, 84, 86  
 Amethia, a clan in Audh, 302  
 Anumiti, divinity of fertility, 387  
*ápamárga* (*Acherantes aspra*), 389  
*arghya*, 378  
 Arniya, or Dardu, a dialect, 141  
 Arrian, says that Indians were not acquainted with the use of the bit for horses, 388  
 Artemis, the Indian Kálí, 82  
 artillery, introduction of, in Europe and Asia, 54, 55, 60  
 Asiatic Fire weapons, 30  
 Astor Valley, 119  
*asvamedha*, or horse sacrifice, required a human sacrifice, 111  
 Audh, Bhars of, 297; races of, 300  
 Ayudhyá, 2, 24; coins found at, 297, 298, 299  
 Azro Shamsheer, a mountain god, 129  
 Aztecs, their human sacrifices, 85

**BABAR**, artillery of, 57  
 Babhru-vahana, a city of Manipura, 47  
 Bacola (*Baklá*), 72  
 Bahádur Sháh, of Dihlí, coin of, 294;—of Bengal, coin of, 295  
 Bais, of Baiswára, 301  
 Baklá (*Bacola*), 72, 76  
 Baku, on the Caspian, 42n.  
 Bal and Dal, Bhar chiefs, 303  
*ballistarius*, 56  
*baloshbut*, or pot-stone, found in Gilgit, 134  
 bamboo, used for conducting inflammable air, 43; etymology of —, 44  
 Bámián, siege of, 35  
 Banáras, Bhars of, 297  
 Banaudhá, 305  
 Bandelgot, a clan in Audh, 302  
 Bánke Bihári Temple, at Brindában, 312  
 Barbuni valley, 122  
 Barjur, in Gilgit, 135  
 Barnáwah, west of Míráth, 371, *postscript*.  
 barter, in Wakhán, 233  
*bárád*, or gunpowder, 37n.  
 Bashgalí, or Káfir country, 125  
 Basops, or sweepers, in Hamírpur, 280  
 Bedár Bakht, of Dihlí, 294; coin of, 293  
 Bengal, Muhammadan coins of, 291  
 Bennett, W. C. Mr., his views on the Audh Bhars, 306  
 Beveridge, H., on 'Were the Sundarbans inhabited in ancient times?', 71  
 Bhakt-Málá, 312, 313  
 Bhalesaltan, a clan in Audh, 302, 306  
*bharddis*, or Bhar-ábádís, 305  
 Bhars, 281, 297; parganahs and towns named after them, 303; the same as Ahírs, 303  
 Bharudi Bais, 307  
 Bharwára, 303



Bhatnár, 33, 34  
 Bhumíya, 305  
 Bihári Jí Temple, at Brindában, 312  
 bitumen, 42*n*.  
*bombarda*, etymology of, 44  
*Bos grunniens*, or yak, 271  
 Boté, a general name for the people of  
 Astor, Gilgit, &c., 128  
 Brahmanism, its relation to Buddhism, 304,  
 382, 386  
 Brindában, 312  
 brooch, as worn in Gilgit, 137  
 Bubbur, in Gilgit, 135  
 Buddhism, its relation to Brahmanism,  
 304, 382, 386  
 Bundelás, 280  
 Bundelkhand, popular songs of, 279  
 Bunjí, 120, 121  
 Burma, petroleum of, 61

**C**ANNA, cane, whence 'cannon', 44  
 Carnegie, Mr. P., on the Bhars of Audh  
 and Banáras, 297  
 Caste songs, in Bundelkhand, 280  
*Chachnámah*, quoted, 39  
 Chakerkot, 121  
 Chamárgor, a clan in Audh, 302  
 Chámungdá, or Chaṇḍiká, a divinity, 113  
 Chand, the poet, mentions fire-arms, 46  
 Chánd Khán, of the Sundarban, 75  
 Chandecan, in the Sundarban, identified,  
 74, 75  
 Chandradíp Rájás, 72  
 charms, or *ta'wíz*, as used in Gilgit, 137  
 Cháturmásya, a sacrifice, 386; is the pro-  
 totype of the Christian Lent, 387  
*chhand*, a kind of poem, 10*n*.  
 Chilás, 120  
 Chitral, 125  
 Chinese, use naphtha for warming and  
 lighting, 43; not the inventors of gun-  
 powder, 63  
 Chitrakút, 2  
 clans, Hindu, in Audh, 302  
 Coins of Dihlí, Málwah, Bengal, Kulbarga,  
 and Kashmir, 291; of Kadphisis and  
 Kanerko, 297  
 complexion, of Gilgitis, 131  
 Constantinople, siege of, 39  
 crocodiles, legends regarding them, 50  
*Cupressus torulosa*, 207

**D**AJIPOKER, in Gilgit, 133  
 Dal, a Bhar chief, 303  
 Dalmau, 303  
 Dandaka forest, 18*n*.  
 Dards, of the Hindu Kush, 140, 141  
 Daśapeya, a rite, 396  
 Dasyus, 299, 300

Delmerick, Mr. J. G., Second List of Rare  
 Muhammadan coins, 291  
*dega*, mortar, 59  
*deg-i-gházi*, one of Bábar's guns, 58  
 Devasuvá a rite, 390  
 Dhámis, a sect, 23*n*.  
 Dhárkar, a clan in Audh, 302  
 Dhámghát, in the 24-Parganahs, 75  
 dialects of Hindí, in Bundelkhand, 282  
 Dihlí, coins of, emperors of, 291; captured  
 by the Muhammadans in 589H., 327;  
 Imperial assemblage held at, three thou-  
 sand years ago, 368  
 Dikhaníya, a rite, 390  
 Dinájpur, whether the ancient Viráta,  
 372*n*.  
 dogs, wild, 269  
 Dogras, or Kashmir troops, 119, 120  
 Doms, or sweeper, in Banáras, 280  
 donkeys, in Gilgit, 138  
 Dorah Pass, 125*n*.  
 drunkenness, in Gilgit, 135  
 Dubari Mount, in Gilgit, 123  
 Dumáras, or sweepers, in Hamírpúr, 280  
 Dumrot, near the upper Indus, 121  
 Durgá Pájá, ritual of, 114, 117

**E**FFIGIES, substituted for living men  
 in sacrifices, 116  
 Egyptians, sacrifice human beings, 83  
 elephants, frightened by Greek fire, 40  
 elm tree, 212  
*Equus hemionus*, 195  
 Êtá, district of, 281

**F**EU *grégois*, or Greek fire, meaning of  
 69*n*.  
 Fire weapons, early Asiatic, 30  
*firingí*, or artillery, 65, 66  
 Firúz Sháh (III), coin of, 291  
 floods of the Indus, 136*n*.

**G**AOKUCH, in Gilgit, 128  
*gávidhuka*, or wild paddy, offered to Ru-  
 dra, 389  
 genealogies, of Hindu chiefs, how fabri-  
 cated, 306  
 Geography, of the Mahábhárata, 375  
 Ghalchah, a general term for the people  
 about the headwaters of the Oxus,  
 139;—languages, 139  
 Gilgit Valley, trip to, by Capt. Marsh, 119  
 Gitch, in Gilgit, 133  
*gol-andáz*, 56  
 Golapur, Fort of, in Gilgit, 132  
 grapes, of Gilgit, 124, 134  
 Greek fire, 31; how quenched, 35  
 Growse, F. S., specimen translation of



Tulsi Dás's Rámáyana, 1 ; on Hari Dás of Brindában, 312  
Gulmutti, in Gilgit, 135  
gun-powder, 32, 37, 40 ; inventor of, 63, 69 ; in Gilgit, 137  
guns, when first used, 56, 57  
Gurgiál, Chitrál, 126  
Gurtam Khán, ruler of Gilgit, 126

## HAMÍRPUR District, popular songs of, 279

*hanumán-natak*, a fire-missile, 46  
Haramush Mount, in Gilgit, 123  
Hari Dás, of Brindában, 312  
Hastinápura, 371, 372  
Hayward, Mr., murdered, 124  
Hindí, language, 2 ; — poetry, 12*n.* ; dialects in Bundelkhand, 282  
Hinduism, a missionary religion, 303 ; morality of, 352  
horse, whether used by Indians with or without a bit, 388  
*ho-tsing*, or fire wells of China, 43  
Human Sacrifices in Ancient India, 76 ; in other countries, 79, 80, 81  
Hunzil, in Gilgit, 130, 131  
Husain Sháh, of Bengal, 295  
Húshang Sháh Ghorí, coin of, 295

**I**BRAHÍM Sháh Súr, coin of, 292  
igneous projectiles, 30  
Indra, kills Vritra, 388  
Indra-turya, a rite, 389  
Indraprastha, 371  
Indus, crocodiles in the, 50

**J**AHANGÍR, coins of, 292  
Jaitpur, in Hamírpúr, 280  
Jalálpúr, in Hamírpúr, 281  
Japoké, in Gilgit, 133  
Jarásandha, of Magadha, 372  
Jessore, in 1699 A.D., 73, 75  
Jesuit missions in Bengal, 73  
Jews, human sacrifices of, 83  
Jugrote, in Gilgit, 122  
*justero*, or village headman, 123  
Jutial, in Gilgit, 124  
Jwála-Mukhí and Kánggrá, 42*n.*

**K**ALANDAR Sháh, 285  
Kálidása, his morality, 352  
Káliká Puráná, mentions human sacrifices, 113, 117  
Kanaui, 19*n.* ; the old Panchála, 371  
Kánggrá and Jwála-Mukhí, 42*n.*  
Kanpúriá, a clan in Audh, 302

*kánwar*, or *bahangí*, pairs of baskets, 286*n.*  
Karambar valley, in Gilgit, 136  
Karamnásá, 7, 8  
Karár, near Jháná, 280  
Kashmír, Muhammadan coins of, 291  
*khalina*, the same as *ddhána*, q. v.  
Khangárs, a caste in Hamírpur, 280  
Khánzáda Rájpúts, 304  
Khawák Pass, 146  
Khojand, siege of, 35  
Khusrau Sháh, of Dihlí, coin of, 291  
Kil'ah Punj, in Chitrál, 126  
Kishkindá, in the Dakhin, 374  
Kochúá, in Báqirganj, 72  
Kola, in Hamírpur, 281  
Krishna worship in Brindában, 312  
Kulbarga, Muhammadan coins of, 291  
Kutb-uddín Aibak, 334

**L**ABRI' KHAN, a Portuguese engineer, 65  
Legends, of Gilgit, 129—regarding crocodiles, 50  
Lent, its Vedic prototype, 387  
Lodhís, a caste in Hamírpur, 281, 289.

**M**ACLAGAN, Major-General, R. E., on early Asiatic Fire-weapons, 30  
Magadha, 8  
*maghríbí*, war engines, 65  
Mahábhárata, the geography of the, 375 ; morality of 377 ; civilization described in—, 384, 385  
Mahábhisheka, a rite, 369  
*mahá-nátak*, a fire missile, 46  
*maháyanttra*, or war engine, 45  
Mahisamite (Mysore ?), 374  
Mahmúd Sháh, Khiljí, coin of, 295 ; —Bahmaní, coin of, 296  
Makhfi, *nom-de-plume* of a daughter of Aurangzib, 308  
*malleolus*, or fire-arrows, 30  
Málwah, Muhammadan coins of, 291  
*mdlya-chandana* 378  
Mandar Hill, 7*n.*  
Manes, feast for the pacification of the, 389  
Maniparbat hill, in Ayudhyá, 298  
Manipura, 47  
Marsh, Capt. H. C., Description of a trip to the Gilgit Valley, 119  
Maruts, and Indra, 388  
Mathurá, 372  
Maudhá, in Hamírpur, 279, 281  
Mazena Pass, 119*n.*  
Mecca, burnt by Hajjáj, 38, 53  
*mittik*, or musket, 66  
Minján, 272  
Minnor, in Gilgit, 123, 129



Mir Walí, the murderer of Hayward, 125  
missions, Jesuit, in Bengal, 73  
morality, of the Mahábhárata, 375; of  
Kálidása, 352  
Muhammad 'Alí Sháh, of Kashmír, coin  
of, 296  
Muhammad Bakhtiyár Khiljí, conqueror  
of Bengal, 331  
Muhammad-bin-Firúz Sháh, coin of, 291  
Muhammad-bin-Tughluq, coin of, 291  
Muhammad-bin-Kásim, the conqueror of  
Sindh, thus called in all native histories,  
342, 343  
Muhammad Yúsuf Sháh, of Kashmír, coin  
of, 296  
Muhammadans, adopt certain Hindú cus-  
toms, 379, 382  
Muhíyy-ul-Millat, 293  
*múmiáí*, 51*n*.

**N**ABHA JI, author of the Bhakt-Málá,  
312

*naífát*, or fire-tube, 39  
*Naft-andáz*, 56  
Nafur, in Gilgit, 124  
Nagesar Náth Mabádeo, 299  
Namuchi Ásura, killed by Indra, 390, 394  
Nanda Bardhan, Rájá of Magadh, 298  
*naphtha*, used for missiles, 31  
*naraballí*, or human sacrifice, 113  
Niladar Pass, in Gilgit, 122  
Nirpiti, a divinity, 387

**O**IL WELLS, in China and America,  
43, 43*n*., 50  
ornaments, gold and silver, 283  
Otrár, siege of, 33  
otters, in Gilgit, 135*n*.

**P**ADYA, 378  
Panchála, or Kanauj, 371  
Pañchedhmiya, a rite, 389  
Pándú, meaning of the word, 370*n*.  
Panipat, battle of (Bábar), 65  
Panwári, in Hamírpur, 279, 281  
Panyal, in Gilgit, 131, 136  
passes, in the Himálayas, 119, 119*n*., 122,  
125*n*., 146  
Páyach, temple of, in Kashmír, 64  
Persian wheel, in Bundelkhand, 289*n*.  
petroleum, 31  
Pimenta, a Jesuit traveller, 73  
Piyadasi, the opponent of Hinduism, 382  
polygamy, among ancient Hindús, 359  
popular songs, of Bundelkhand, 279  
pork, eaten by Rájputa and Rájbhars, 305  
Prán Náth, founder of the Dhámi sect, 23*n*.

Prannáth Pañdit, on the Morals of Káli-  
dása, 352  
Pratápaditya, Rájá, 74  
precedence, among Indian princes, 379  
Pulwars, a clan in Audh, 302  
Puránas, recognise human sacrifices, 118  
*purushamedha*, or human sacrifices, 102,  
103, 118

**R**AJASUYA, the great sacrifice of the  
Pándavas, 368, 382, 385  
Rajbhars, 305  
Rájendralála Mitra, on Human Sacrifices  
in Ancient India, 76; an Imperial assem-  
blage at Delhi, three thousand years  
ago, 368  
Rájputa, of Audh, 301  
Rakiposhi, in Gilgit, 123  
Rámas, the three, 15  
Rámáyana of Tulsi Dás, 1, of Válmiki, 1  
*Rám-charit-mánas*, title of the Hindí Rá-  
máyana, 2, 25*n*.  
Rangpur, whether the ancient Viráta, 372*n*  
Rantanbhor, fort of, 65  
*ras*, the nine styles, 26*n*.  
Ráth, in Hamírpur, 281  
Ratninám Havi, a rite, 390  
Raverty, H. G. Major, Reply to Contri-  
butions to Bengal History, No. III,  
325; his views on the Persian *Isáfát*  
and other points of Persian Grammar,  
336, 341  
Rudra, and his wife Ambá, 389

**S**ACRIFICES, human, in Ancient In-  
dia, 76  
Sahet-Mahet, a centre of Buddhism, 297  
Sákamedha Parva, 388  
Sakewan, in Gilgit, 123  
*sálagráma*, 315  
salt, of Bengal, 71  
Sanglich, dialect of, 272  
Sañhita, mentions human sacrifices, 89, 90  
Sañsripa Havi, rite, 396  
Sariñoli language, 139, 158  
*sataghni*, a fire-arm, 45  
Sautrámani, a rite, 396  
scorpions, used as missiles, 53  
seasons, six Hindú, 28*n*.  
Sháh Jahán II, coin of, 293  
Shaw, Mr. R. B., on the Ghalchah lan-  
guages (Wakhí and Sariñoli), 139  
Sheothur Pass, in Astor, 119  
Shere, in Gilgit, 133  
Sher Kil'a, in Gilgit, 132  
Sherote, in Gilgit, 131, 132  
*shet-aghni*, a fire-arm, 44  
Shighnan, language of, 272



Shins, a Himálayan tribe, 120, 121, 128  
 Shirbadut, Rájá, 128  
 Sindh, conquered by Muhammad, son of Kásim, 342, 343  
 Singdas, a mountain in Gilgit, 135  
 Singul, in Gilgit, 133, 134  
 Sisupál, king of Chedi, 379  
 Siyáhpash Káfir, 146  
 Smith, Mr. Vincent A., popular songs in Bundelkhand, 279  
 Sondíp, 71, 72  
 songs, popular, of Bundelkhand, 279  
 Soron, birthplace of Tulsi Dás, 2; etymology *f.* 22*n.*  
 Srí Swámí Hari Dás, 312  
 Súkhargrá ma, or Súkharkhet, *i. e.* Soron, 22, 22*n.*  
 sulphur, from Akhín, 70  
 Sunáhépha, mentioned in the Sañhitá as sacrificed, 89  
 Súnasírya, a rite, 389  
 Sundarbans, whether inhabited formerly, 71  
 Sye River, 121  
 Syrens, 81

**T**AJIK, or Iranian, 139, 140  
 Tánzen, Akbar's chief singer, 316  
 Tantras, enjoin human sacrifices, 118  
 Tatíal, a part of Chitral, 125  
 ta'wíz, or charms, as used in Gilgit, 137  
 'Ter Schelling,' wreck of, 72  
 Tilokchand, founder of the Bais clan, 301, 302, 306  
 Timur, his mode of warfare, 32  
 Tryambaka Purodása, a feast for the manes, 389  
 tubes, used for throwing Greek fire, 40  
 Tulsi Dás, 1

**V**AISHNAVAS, 312, 324*n.*  
 Vaisvadeva Parva, 387  
 Váranávrata (modern Allahabad), 371; or rather Barnáwa, west of Míratb, 371, *postscript.*  
 Varuna-praghása Parva, 388  
 Vedas, mention human sacrifices, 89  
 Vernacular literature, despised by Pandits, 2  
 vinegar, quenches Greek fire, 35  
 vintage, in Gilgit, 124, 134  
 Viráta, whether the modera Rangpúr and Dinajpúr, 372*n.*  
 Vritra, killed by Indra, 388

**W**AKHI, language of Wakhán, 139  
 Wassá, or autumnal rite, 387  
 weights and measures, in Wakhán, 268  
 Whalley, P., translations from the Díwán of Makhfi, 308  
 Wheeler, Mr., his ideas on the Delhi assemblage, 382

**Y**ADAVAS, hold Mathurá, 372  
 Yágistán, or Independent (*yágit*) country on the Upper Indus, 122, 126, 138  
 Yak, or *Bos grunniens*, 271  
 Yárkand, 233  
 Yarkun, a range of the Hindúkush, 126  
 Yaspur Kun, in Gilgit, 130  
 Yassin, 124, 125  
 Yeshkun, a mixed race in Gilgit, 128  
 Yudhishthira, 360; his Díhlf assemblage, 378

**Z**IRB-UN-NISA-BEGAM, 308





JOURNAL  
OF THE  
ASIATIC SOCIETY OF BENGAL.



VOL. XLV.

PART I. (HISTORY, ANTIQUITIES, &C.)

(Nos. I to III.—1876: with seven plates.)

EDITED BY

THE PHILOLOGICAL SECRETARY.

---

“It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease.” SIR WM. JONES.

---

CALCUTTA:

PRINTED BY C. B. LEWIS, AT THE BAPTIST MISSION PRESS.

1876.





# CONTENTS

OF

JOURNAL, ASIATIC SOCIETY OF BENGAL, PART I,

FOR 1876.

|                                                                                                                                                                | <i>Page</i> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| No. I.                                                                                                                                                         |             |
| The Prologue to the Rámáyana of Tulsi Dás. A specimen translation.—By F. S. GROWSE, M. A., B. C. S., .....                                                     | 1           |
| On Early Asiatic Fire Weapons.—By MAJOR-GENERAL R. MACLAGAN, R. E., .....                                                                                      | 30          |
| Were the Sundarbans inhabited in ancient times?—By H. BEVERIDGE, B. C. S., .....                                                                               | 71          |
| On Human Sacrifices in Ancient India.—By RÁJENDRALÁLA MITRA, LL. D., .....                                                                                     | 76          |
| No. II.                                                                                                                                                        |             |
| Description of a trip to the Gilgit Valley, a dependency of the Maharájá of Kashmir.—By CAPT. H. C. MARSH, 18th Bengal Cavalry (with four plates), .....       | 119         |
| On the Ghalchah Languages (Wakhí and Sariḳolí).—By R. B. SHAW, Political Agent, late on special duty at Káshghar, .....                                        | 139         |
| No. III.                                                                                                                                                       |             |
| Popular Songs of the Hamírpur District in Bundelkhand, N. W. P. No. II.—By VINCENT A. SMITH, B. A., C. S., .....                                               | 279         |
| List of Rare Muhammadan Coins.—No. II. (Coins of the Kings of Dihlí, Málwah, Bengal, Kulbarga, and Kashmir.—By J. G. DELMERICK, Dihlí, (with two plates) ..... | 291         |
| The Bhars of Audh and Banáras.—By PATRICK CARNEGIE, Commissioner of Rái Bareli, Audh, .....                                                                    | 297         |



|                                                                                                                                                                                                                     | <i>Page</i> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Translations from the <i>Díwán</i> of ZÍB-UN-NISÁ BEGAM, poetically styled 'MAKHFI', daughter of the Emperor AURANGZÍB.—By P. WHALLEY, B. C. S., Murádábád, .....                                                   | 308         |
| Sri Swámi Hari Dás of Brindában.—By F. S. GROWSE, M. A., B. C. S., (with one plate) .....                                                                                                                           | 312         |
| Reply to several passages in Mr. Blochmann's "Contributions to the History and Geography of Bengal," No. III.—By the Translator of the <i>Ṭabaḳát-i-Náṣirí</i> , Major H. G. RAVERTY, Bombay Army, (Retired), ..... | 325         |
| Morals of Kálidása.—By PRANNÁTH PAṆḌIT, M. A.,.....                                                                                                                                                                 | 352         |
| An Imperial Assemblage at Delhi three thousand years ago.—By RÁJENDRALÁLA MITRA, LL. D., .....                                                                                                                      | 368         |
| Index,.....                                                                                                                                                                                                         | 399         |

---



# LIST OF PLATES

IN

JOURNAL, ASIATIC SOCIETY OF BENGAL, PART I,

FOR 1876.

- 
- Pl. I. (p. 135) View of Gaokuch.  
Pl. II. (p. 119) View of Mazena Pass.  
Pl. III. (p. 136) View of the junction of the Karambar and Yassin  
Rivers.  
Pl. IV. (p. 119) Sketch Map of countries surrounding Gilgit.  
Plates V and VI. (p. 291) Unpublished Muhammadan coins.  
Pl. VII. (p. 312) Gateway of the Bánke Bihári Temple at Brindában.
-



# ERRATA

IN

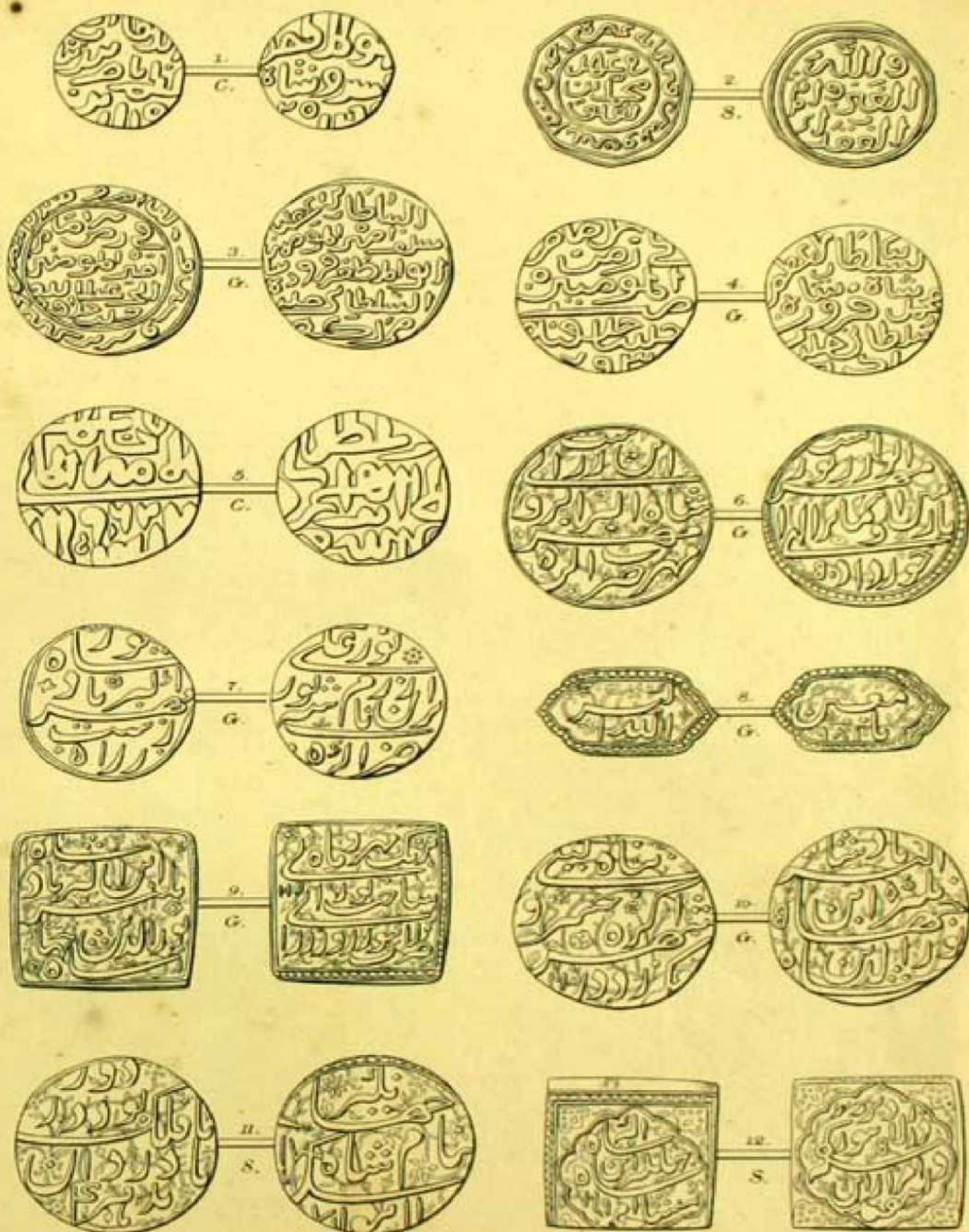
JOURNAL, ASIATIC SOCIETY OF BENGAL, PART I,

FOR 1876.

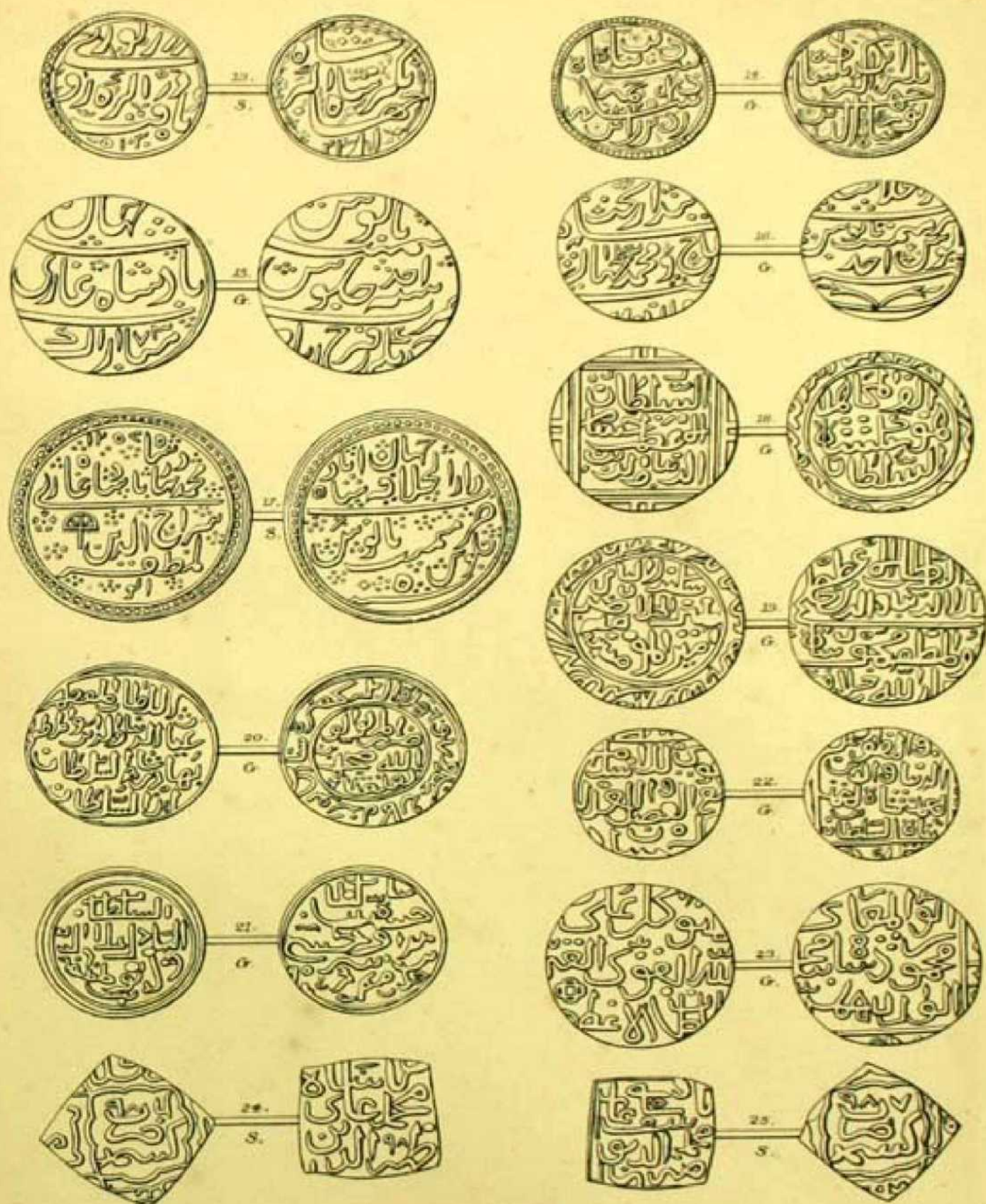
Page 141, l. 19, and p. 152, l. 18, for *zûi* read *zûi*

- „ 143, l. 27, for *صيرور* read *صيرور*
- „ 150, l. 6 from below, for with the read with the house, and for in the houses read with the houses
- „ 157, l. 8, for *kshôn-i* read *kshôn-at*
- „ 159, l. 26, for *yu* read *yû*
- „ 160, l. 2, from below, for doing read taking
- „ 185, note, for *khan* and *san*, read *khan* and *sau*
- „ 186, l. 4, in column "Indian, Modern", after apricot insert *chîr*, Gaddî
- „ 186, l. 4 from below, in column "Ghalchah", for *kashîr* read *khshîr*
- „ 188, l. 6, for *shanîdan* read *shunîdan*
- „ 188, l. 5 from below, for *karbej* read *khar-bej*
- „ 332, l. 23, for *Shîam* read *Shiâm*
- „ 334, l. 5, from below, for *شکسته* read *شکسته*
- „ 349, l. 14, for *we* read *he*
- „ 381, l. 20, for assembled read had assembled
- „ 390, l. 22, for *Raterinâm* read *Ratinâm*
- „ 390, l. 29, for gymnasium read gynaeceum
- „ 396, l. 25, for *scymitar* read *scimitar*
- „ 396, l. 26, dele comma after and













# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

Part II.—PHYSICAL SCIENCE.

No. II.—1876.

VII.—*An Account of Experiments made in 1875 and 1876 in various parts of India, for the purpose of comparing the observed Temperature of the Dew-point with that computed from the Psychrometer by different Methods of Reduction.*—By HENRY F. BLANFORD, F. G. S., Meteorological Reporter to the Government of India.

(Received May 29th ;—Read June 7th, 1876.)

The observations of which the results are detailed and discussed in this paper, were made with the special object of ascertaining how far the usual methods of computing the hygrometric state of the atmosphere from observations of the dry and wet bulbs thermometers, under the conditions\* now adopted at Indian meteorological observatories, afford trustworthy results; more especially in the extremely dry atmosphere of the interior of India during the hot season. The observations are to a certain extent desultory, having been made during inspection tours in different parts of India, and under various conditions of exposure; and the results shew some discrepancies, greater than might be expected from more systematic work, and had there been means at hand to introduce such improvements in the manipulation of the hygrometer as experience has suggested. Causes of disturbance, which would produce but little effect in a more humid atmosphere, become influential when the dew point is  $40^{\circ}$  and

\* The thermometers are exposed on a frame with 1 or 2 cross bars (generally protected by wire netting at back and front) under a thatched shed open on all sides to the wind. Where properly constructed the shed is 20 ft. long by 12 ft. wide, but some are smaller than this.



more below the temperature of the air, and observations made at a distance from all the convenient appliances of a physical laboratory, in hot winds and under the intense glare of an Indian sun, are not easily endowed with that precision which is desirable and which is easily to be attained in a well fitted observatory of a high class. I can only say that I have endeavoured to take all such precautions as were practicable and if the range of individual error is on the whole considerable, I believe that the mean result affords a trustworthy criterion of the comparative value of the psychrometric methods; and that, with proper precautions, very trustworthy data of the hygrometric state of the atmosphere may be obtained with the dry and wet bulb thermometers, at all events when the humidity does not fall below 20 per cent. of saturation. Greater degrees of dryness I have as yet had no opportunity of testing; though such are prevalent somewhat later in the season than when my observations were made; especially in Sind and the Punjab, and on the plateau of Central India.

The earlier series of observations were made during an inspection tour in the Madras Presidency, in April 1875. I regret that the original rough record has been mislaid, and I am able to give only the means of each set of readings. In these series (Nos. 1 to 13 of the Tables), the means adopted for the readings of the Regnault's hygrometer include the temperatures at which the dew disappeared from the silver capsule of the instrument, which is not the case with the later series. In striking the adopted mean of each set of readings, the mean temperature at which dew was deposited and that at which it disappeared were taken separately, and the mean of the two results adopted as the dew-point. The difference, however, rarely amounted to a degree, and is very small in comparison with the difference of the temperature and that of the dew-point.

The later series were made during a recent tour in Upper India, in the months of March and April. The air temperatures are generally lower than the Madras series, but the dew-points are proportionally lower. They indicate a very dry atmosphere, although not so low a relative humidity as is shewn later in the season by the registers of many stations in the interior.

The same hygrometer has been used throughout. It is one of Casella's manufacture, and is of the form represented in his illustrated catalogue; it has a single capsule, the air-thermometer being freely exposed; and the evaporation of the ether is accelerated by blowing from the mouth through a piece of elastic tubing about 15 inches in length. Both the thermometers have been verified by myself; at the freezing point by immersion in crushed ice; and through the range of observation, by comparison with a Kew standard (No. 374) which I received in 1868 from Prof. Balfour Stewart.

At the Madras stations (excepting Trichinopoly and Madras), the psychrometric observations were made with the observatory thermometers



(with small pea-bulbs) which Mr. Pogson had verified by comparison with a Kew standard in his possession.

The Upper Indian series (16 to 21) of psychrometric observations were made with a pair of Casella's thermometers of the Kew pattern (with small spherical bulbs) mounted, 6 inches apart, on a portable wooden stand, in such manner that the free access of air is unimpeded in all directions. Both thermometers have been compared in water with my Kew standard and have also been verified at the freezing point. The wet bulb was covered with a single thickness of old thin calico; the water bottle was placed 2 inches to the side of the bulb, with the water level  $\frac{1}{4}$  inch below it, and communication was made by a well-washed lamp-wick of some dozen threads of coarse yarn. Care was taken that the bulb was at all times well moistened.

The psychrometer observations at Trichinopoly, Madras, and Calcutta were taken with a sling thermometer, *viz.* that of the hygrometer, in the intervals of the dew-point observations.

In most cases the readings of the instruments were made by two observers, one of whom (myself) read off the Regnault, and the other the psychrometer, on the dew-point signal being given by the first observer. In very dry states of the atmosphere, the mercury of both the dry and wet bulbs is in a state of constant oscillation, through a range of a degree or more; moreover, unless the silver capsule is very highly burnished and free from microscopic scratches, there is considerable difficulty in seizing the exact temperature at which dew appears, since the quantity deposited is very small and but slightly dulls the surface even at 3 or 4° below the dew-point. The surface of the capsule having been polished with plate-powder, was not in the best condition, and it is likely that some of the discrepancies to be noticed in the tables may have been in some measure due to this; but I do not think that the error thus arising could exceed a few tenths of a degree, as great watchfulness was exerted, and any observation that appeared doubtful at the time was rejected. I shall in the sequel suggest some precautions and improvements which may be useful to future observers.

In the following Tables, the dew-point determined directly by the hygrometer is compared with that computed from simultaneous observations of the psychrometer by each of the three methods in common use. The first is August's formula as corrected by Regnault and adapted to English standards. It is given at page 47 of Guyot's *Hygrometric Tables*, for wet-bulb temperatures above the freezing point as follows:

$$x = f - \frac{0.480 \times \frac{5}{9} (t - t')}{610 - \frac{5}{9} (t' - 32)} h = f - \frac{0.480 (t - t')}{1130 - t'} h$$

wherein  $x$  is the tension of saturated vapour at the temperature of the dew-



point,  $f$  the same at the temperature  $t'$  of the wet bulb,  $t$  the air temperature and  $h$  the barometer reading.

The development of this formula may be found in Regnault's original paper, published in the *Comptes rendus* for April 1845, or in the translation given in the 3rd Volume of Taylor's Scientific Memoirs. Also in the article 'Hygrometry' in Watts's Chemical dictionary. It is based on the assumption that the film of air around the wet bulb is saturated with vapour, and that the heat lost by this film of air, in falling to the temperature of the wet bulb, is exactly equal to the latent heat absorbed by the water which passes into vapour in the act of bringing it to saturation.

The second is Apjohn's well-known formula, given in almost all English manuals of physics and meteorology, as follows, for temperatures of  $t'$  above the freezing point :

$$x = f - \frac{t-t'}{88} \cdot \frac{h}{30}$$

The development of this formula was given by Dr. Apjohn in the Transactions of the Royal Irish Academy, November 1834, and is reproduced in Professor Everett's translation of Deschanel's Natural Philosophy. It proceeds on precisely the same assumption as the previous formula, but assumes a mean constant instead of a variable value for the latent heat of vapour, by which the formula is somewhat simplified ; the difference of the results afforded by Apjohn's and August's formula depends, however, mainly on the different values assumed for the constant coefficients common to the two formulæ.

In applying these formulæ, I have taken the vapour-tensions from a table lately computed for the mean latitude of 22°, from that given by the Rev. Robert Dixon for the latitude of Dublin.

Glaisher's factors, with which the third values of the dew-point are obtained, are those published in 1856. Their use is of course open to the objection that they take no account of variations of barometric pressure. As a rule they seem to give a result too low with a high relative humidity and too high with low humidities.







TABLE I. A.—*Continued.*

| PLACE.                                                | Date.       | Hour. Series.  | REGNAULT'S HYGRO-METER. |      |       | MASON'S HYGROMETER. |      |           |      | Red Bar. | COMPUTED D. P. |         |      | REMARKS.                                                                                                               |
|-------------------------------------------------------|-------------|----------------|-------------------------|------|-------|---------------------|------|-----------|------|----------|----------------|---------|------|------------------------------------------------------------------------------------------------------------------------|
|                                                       |             |                | No. of obs.             | Air. | D. P. | No. of obs.         | Dry. | Wet Diff. | Aug. |          | Apj.           | Glaish. |      |                                                                                                                        |
|                                                       |             |                |                         |      |       |                     |      |           |      |          |                |         |      |                                                                                                                        |
| Coimbatore. In thermometer shed of observatory.       | April 16th. | h. m.          |                         |      |       |                     |      |           |      |          |                |         |      |                                                                                                                        |
|                                                       |             | 15 33 to 15 54 | 8                       | 96.7 | 48.6  | 5                   | 96.8 | 68.9      | 27.9 | } 28.39  | 49.1           | 53.2    | 52.4 | Anemometer, on shed, 5 miles an hour. Breeze occasionally felt in shed.                                                |
|                                                       |             | 15 50 to 16 35 | 1                       | 96.1 | 46.5  | 1                   | 96.4 | 68.5      | 27.9 |          | 48.4           | 52.6    | 52.0 | Wind E. Fanning wet bulb produced no reduction.                                                                        |
|                                                       |             | 16 35 to 16 50 | 10                      | 95.7 | 52.8  | 5                   | 95.3 | 69.9      | 25.4 |          | 53.1           | 56.6    | 54.7 |                                                                                                                        |
| Trichinopoly. In verandah on 1st floor.               | April 21st  | 17 25 to 17 45 | 6                       | 89.6 | 71.0  | 3                   | 89.6 | 77.2      | 12.4 | 29.35    | 71.7           | 72.7    | 69.4 | Wet B. temperature taken with D. P. thermometer of Regnault with wet muslin on bulb used as <i>thermomètre fondé</i> . |
|                                                       |             |                |                         |      |       |                     |      |           |      |          |                |         |      |                                                                                                                        |
| Madras. In verandah of upper storey.                  | April 25th. | 11 40 to 12 3  | 5                       | 97.2 | 61.1  | 3                   | 97.0 | 74.1      | 22.9 | 29.72    | 60.8           | 63.4    | 60.6 | As the previous series.                                                                                                |
|                                                       |             |                |                         |      |       |                     |      |           |      |          |                |         |      |                                                                                                                        |
| Calcutta. In ground-floor room, windows open 2 sides. | June 18th.  | 11 15 to 11 22 | 9                       | 84.8 | 77.8  | 2                   | 84.2 | 79.4      | 4.8  | 29.60    | 77.4           | 77.7    | 76.2 | As the previous series.                                                                                                |
|                                                       |             |                |                         |      |       |                     |      |           |      |          |                |         |      |                                                                                                                        |
| Calcutta, as above.                                   | June 19th.  | 9 30 to 9 45   | 12                      | 83.8 | 77.5  | 2                   | 83.8 | 79.7      | 4.1  | 29.55    | 78.0           | 78.3    | 77.0 | As the previous series.                                                                                                |











Assuming the direct dew-point determinations to be correct, the following are the errors shewn by the several computations.

TABLE II.—*Errors of Dew-points computed from Psychrometer by different methods.*

| PLACE.           | Series. | D. P.<br>below<br>air. | ERRORS. |         |         | CONDITIONS.          |
|------------------|---------|------------------------|---------|---------|---------|----------------------|
|                  |         |                        | Aug.    | Apj.    | Glaish. |                      |
| Secunderabad, .. | 1       | 44.7                   | + 2.5   | + 6.1   | + 5.4   | In thermometer-shed, |
| Do. ..           | 2       | 41.0                   | + 3.3   | + 5.9   | + 3.4   |                      |
| Do. ..           | 3       | 44.0                   | + 4.9   | + 8.0   | + 5.6   |                      |
| Do. ..           | 4       | 41.9                   | + 3.9   | + 7.0   | + 4.6   |                      |
| Bellary, ..      | 5       | 40.7                   | — 0.4   | + 2.8   | + 0.9   | Do.                  |
| Do. ..           | 6       | ? 37.0                 | ? — 7.0 | ? — 3.3 | ? — 4.7 |                      |
| Do. ..           | 7       | 43.7                   | — 2.0   | + 1.9   | + 0.9   |                      |
| Do. ..           | 8       | 48.3                   | — 4.6   | + 0.6   | + 1.6   |                      |
| Combatoor, ..    | 9       | 48.1                   | + 0.5   | + 4.6   | + 3.8   | Do.                  |
| Do. ..           | 10      | 49.6                   | + 1.9   | + 6.1   | + 5.5   |                      |
| Do. ..           | 11      | 42.9                   | + 0.3   | + 3.8   | + 1.9   |                      |
| Trichinopoly, .. | 12      | 18.5                   | + 0.7   | + 1.7   | — 1.6   |                      |
| Madras, ..       | 13      | 31.1                   | — 0.3   | + 2.3   | — 0.5   | In verandah. Sling-  |
| Calcutta, ..     | 14      | 13.0                   | — 0.4   | — 0.1   | — 1.6   | thermometers.        |
| Do. ..           | 15      | 6.3                    | + 0.5   | + 0.8   | — 0.5   | Do. Do.              |
| Allahabad, ..    | 16      | 29.3                   | + 0.2   | + 3.0   | + 2.9   | In sitting room. Do. |
| Do. ..           | 17      | 41.4                   | + 1.8   | + 5.4   | + 5.4   |                      |
| Agra, ..         | 18      | 45.1                   | — 6.1   | — 0.2   | + 3.7   |                      |
| Lahore, ..       | 19      | 42.9                   | + 4.6   | + 8.2   | + 8.7   |                      |
| Do. ..           | 20      | 35.4                   | — 2.9   | + 1.4   | + 3.2   | In thermometer-shed. |
| Do. ..           | 21      | 37.6                   | + 0.8   | + 4.6   | + 6.7   |                      |
| Mean,* ..        | ..      | ..                     | + 0.46  | + 3.70  | + 3.00  |                      |

In most of the above series the computed is higher than the observed dew-point, especially when the computation is made by Apjohn's formula. The exceptions are series 6 at Bellary (in which, however, I think the dew-point observation is open to considerable doubt†) and series 14 at Calcutta and 18 at Agra, in which the computed values are too low.

The following table exhibits the mean results of the table of errors, *viz.*, the numbers of sets of observations which give excessive or deficient dew-point temperatures, the mean error, the extreme errors and the sums of the squares of the errors, positive and negative, by each method of reduction.

\* Omitting series 6.

† It is not unlikely that there has been some error in the determination of the dew-point by the direct method, which, it may be observed, is derived from 2 observations only (one of deposition and one of disappearance). These observations were taken in among the 7 of the preceding series, and I have separated them on account of their discrepancy. I have not, however, felt justified in rejecting them, since I have no knowledge of any cause of error affecting them which might not have affected others.



TABLE III.

| Method.            | Sets obs.  |            | Mean<br>Error. | Highest.<br>+ | Lowest.<br>— | Sums of squares<br>of errors. |       |
|--------------------|------------|------------|----------------|---------------|--------------|-------------------------------|-------|
|                    | in excess. | in defect. |                |               |              | +                             | —     |
| By August's form., | 13         | 7          | + 0.46         | 4.9           | 6.1          | 86.13                         | 71.19 |
| „ Apjohn's „       | 18         | 2          | + 3.70         | 8.0           | 0.2          | 406.98                        | 0.05  |
| „ Glaisher's facs. | 16         | 4          | + 3.00         | 8.7           | 1.6          | 327.80                        | 5.62  |

If we take those series only that were made in the thermometer-sheds, with a mean difference of  $42.7^{\circ}$  (extremes  $35.4$  and  $49.6$ ) between the air-temperature and the dew-point, the errors of the several methods are as follow :

TABLE IV.

| Method.             | Series.    |         | Mean<br>Error. | Highest.<br>+ | Lowest.<br>— | Sums of squares<br>of errors. |       |
|---------------------|------------|---------|----------------|---------------|--------------|-------------------------------|-------|
|                     | in excess. | in def. |                |               |              | +                             | —     |
| By August's form.,  | 8          | 4       | + 0.68         | 4.9           | 4.6          | 60.95                         | 33.73 |
| „ Apjohn's „        | 12         | 0       | + 4.40         | 8.0           | —            | 292.76                        | —     |
| „ Glaisher's facs., | 12         | 0       | + 3.62         | 6.7           | —            | 200.85                        | —     |

The first general conclusion to be drawn from this discussion is that while the results shew a considerable range of error (which may be in part due to a faulty use of the Regnault), on the mean of all the observations, the dew-point computed by August's formula from observations of the psychrometer made under an open shed, comes very near to that observed with Regnault's hygrometer, even when the dew-point is more than  $40^{\circ}$  below the temperature of the air. Both Apjohn's formula and Glaisher's factors appear to give too high a result.

With regard to the less complete exposure afforded by a verandah, or any place through which the air is not moving freely, the two Allahabad series (16 and 17) and the first Lahore series (19) shew that the psychrometer, in such a situation, gives too high a humidity by all the methods of reduction ; and the Secunderabad series (1 to 4) though made under a shed, tend to support the conclusion that a still atmosphere is prejudicial to all the psychrometric method. These observations were taken on the day of



the solar eclipse; the sky was cloudy; and in the shed, the air was appreciably motionless. The shed was screened from such little wind as stirred the anemometer, partly by a neighbouring building, and partly by rising ground. Even on the top of a neighbouring rock, on which the anemometer was fixed on a post, there was sufficient air only to stir the vanes at intervals, and in the shed the atmosphere was still and oppressive. Hence it would appear that under all conditions a still atmosphere is unfavourable to the accuracy of the psychrometric method. This conclusion has already been drawn by previous observers.

These conclusions must nevertheless be regarded as provisional only, until similar experiments shall have been made with more consistent results.

I have said that the experience now gained has shewn the necessity for some additional precautions and improvements in the use of the Regnault's hygrometer in a very dry atmosphere; and I will mention these, in the hope that other observers may be induced to pursue the investigation. These are—

1st.—The silver capsule must be highly burnished and free from microscopic scratches, which so reflect the light as to make it very difficult to seize the moment of dew-deposition. This surface can be given only by hand-polishing with the softest part of the skin (care being taken that the skin is free from grit) and with the application of a little carefully kept jeweller's rouge. Plate powder, wash leather, and soft rag are equally to be avoided; and when once polished, great care must be taken to preserve the instrument from grit and dust. The Indian rubber tube which communicates with the air pipe, must be kept apart from the instrument when not in use, or the sulphur evaporating from it will quickly blacken the surface.

2nd.—The mouth tube of Casella's instruments should be replaced by a finger bellows or some other portable form of blower which can be worked rapidly but is under complete control; or else the instrument should be adapted for the use of an aspirator.

3rd.—A black screen should be so placed at the side of the instrument that its reflection may be thrown from one side of the silver capsule to the eye.

4th.—In experimenting in the open air, great care must be taken not to sit to windward of the hygrometer and not to approach it nearer than is absolutely necessary to take the reading. The mouth and nose should be covered with a handkerchief during the experiment to prevent any breath reaching the instrument.

5th.—In very dry states of the atmosphere it is best to take a preliminary observation in which the blowing is continued until a decided and comparatively copious deposit is formed, noting as nearly as possible the temperature at which it first appears. This observation is made for guid-



ance only. In the subsequent observations, by regulating the flow of air, the temperature is to be lowered very gradually as it approaches the point noted; and on the first appearance of dullness, the blast is arrested, but the reading of the thermometer is not to be taken till it reaches its lowest point.

There are other points to be attended to, which unpractised observers frequently neglect. One is to keep the eye on the same level as the top of the mercurial column of the thermometer (whether that of the hygrometer or psychrometer) when taking the reading, in order to avoid the errors of parallax. This is a point which it is most difficult to enforce on those who are not thoroughly trained observers, and such persons are few in India.

The capsule must not be more than three parts filled with ether, and at first a very gentle blast must be applied or the ether will spill over the surface of the capsule; and if not perfectly pure, will impair its polish. The ether must be free from water.

---

VIII.—*List of the Birds collected on the Expedition into the Dafla Hills, Assam, together with those obtained in the adjacent Darrang Terai.—By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S., &c., Deputy Supt. Topographical Survey of India.*

(Received May 26th;—Read June 7th 1876).

(With Plates III & IV.)

Having been placed in charge of the survey-party attached to the force which, under the command of Brigadier-General W. J. F. Stafford, C. B., penetrated into the Dafla Hills during the winter of 1874—75, an opportunity was presented of forming collections in a portion of the N. E. Frontier which had never before been visited. It was an opportunity not to be lost, as it would extend considerably the undoubted range of many interesting or little-known Himalayan forms towards the east into the Indo-Burman and West China faunas; while there was also the great probability of discovering new forms, not only among the birds, but in other branches of zoology. On arriving in Calcutta in October 1874, I received much assistance and advice from Messrs. Wood-Mason and G. Nevill, of the Indian Museum, and at the recommendation of the former was permitted to entertain and take with me a native taxidermist, with extra coolies for the carriage of specimens, store-boxes, &c.; my cordial thanks are due for this aid and for the interest shewn by the above-named gentlemen. The list shews that I was tolerably successful, notwithstanding that the force did not penetrate beyond the first large valley at the back of the outer range,



which attains an elevation of from 4000—8000 feet. Had I reached the inner ranges of 10—12000 feet lying beyond, and got out of the region of dense sombre forest, there is no doubt but that my success would have been much greater. It may be said that from Darjiling to this part of the Eastern Himálaya, a distance of 280 miles, the ground had scarcely been worked, for the few mammals, birds, reptiles, &c., collected in Bhútan, or recorded as found there, have mostly come from the portion of the country in the neighbourhood of Darjiling. A few birds were collected by the mission under that zealous and talented explorer Captain Pemberton, in 1838, accompanied by Dr. Griffiths, who was more interested in the botany than in the zoology; while the mission under the hon. Ashley Eden started with a taxidermist, who, owing to the difficulty of obtaining coolies, had to be sent back from Sipchú just beyond Dalingkote, after having only obtained a few ordinary Darjiling species; and Mr. L. Mandelli has, I believe, been lately sending his collectors into the Western Bhutan Doars; but from the Sunkos River, eastward, no naturalist has had a chance of exploring the outer hill-tracts.

I was fortunate in having assistants who took a lively interest in collecting, and my thanks are especially due to Messrs. Ogle and Robert, of the Topographical Survey, and to Mr. J. Lister, of the Botanical Gardens, Calcutta, who was attached to my party to collect botanical specimens. Mr. Robert's zeal and energy have been conspicuous, both here and in the Naga Hills, and the list of species has been largely added to by him. General Stafford and other officers of the force took a lively interest in the birds of the country, and I am indebted to them for several interesting things.

The portion of the Eastern Himalaya occupied by the Dafla Tribe, wherein the collection was made, extends from E. long. 93° to long. 94°, on lat. 27°, or a distance of about 60 miles. The district of Darrung lies along the base of the hills extending south to the Brahmaputra River, with a breadth of about 18 miles.

The hill-portion of the Dafla country is covered from base to summit with dense forest, the larger trees being clothed with thick creepers; and the bottoms of the ravines are occupied by a luxuriant growth of bamboo, canes, tree-ferns, screw-pines, plantains, &c. Such luxuriant vegetation renders the scenery on rivers like the Dikrang and Burroi exceedingly beautiful, but it is monotonous. As one ascends, the underwood becomes thinner, and at 7000 feet the forest is composed almost exclusively of a straight-stemmed bamboo, with oak, rhododendron, and other large trees. Clearings for cultivation are the only open ground seen, and these are of no great extent. The Terai portion between the Dikrang and Burroi, where a good many birds in the list were obtained, is covered with a sea of high grass, intersected with sluggish nullas, the banks of which are generally fringed with forest;



this extends towards and meets the forest belt at the foot of the hills, a belt which occasionally attains a breadth of some 8 miles and is most difficult to work through. On the upper plateaux, such as the Bishnath plain, the grass grows in less luxuriance, the country is much more open, and a change in the birds is noticed at once. Compared with other parts in which I have collected, birds are rare, both in point of number and species, and this is no doubt due to the very large extent of sombre dark forest, all possessing the same character; we were there too rather early in the year and before the advent of a number of species that make their appearance later when the large flowering trees begin to blossom.

In this list I have omitted a number of the Grallatores to be found in the nullas of the Terai, and the list of forms occurring in this part of the Assam valley is by no means complete. Some of the commoner birds, such as *Ploceus baya*, *Copsychus saularis*, &c., are not in the collection, either from not having been shot or considered worth preserving. A flock of stone-plover, probably *Esacus recurvirostris*, Cuv., was seen amongst the boulders in the bed of the Burroi River just within the gorge, but I failed to secure a specimen, and the presence of our camp in the place soon scared them away.

Lord Walden has again most kindly assisted me in the identification and nomenclature, and pointed out many points of interest concerning some of the species.

Duplicates of nearly all the species enumerated have been selected for the India Museum, Calcutta. All species marked with an asterisk have not been recorded in my former lists of birds from the N. E. Frontier.

#### 4. GYPS INDICUS, Scopoli.

#### 5. GYPS BENGALENSIS, Gmelin.

Both this and the preceding species were seen in hundreds feeding on the dead buffaloes lying along the road-side. Large droves of these animals were passing up towards Debrughur, and numbers were dying daily from some disease, affording a rich feast for the vultures and jackals.

#### 17. TINNUNCULUS ALAUDARIUS, Brisson.

#### 20 a. MICROHIERAX MELANOLEUCUS, Blyth.

The only species of this genus seen was the above. I noticed it sitting on the topmost twig of a very high tree, from which it sallied forth now and then to capture an insect. Its breast gleamed white against the dark blue sky, but, as it was far out of shot and there was no possibility of getting near the base of the tree owing to the extreme denseness of the underwood and canes, I had to content myself with watching its movements through my binoculars.



53. *CIRCUS MELANOLEUCUS*, Gmelin.

A male and a female were shot in March on the Bishnath plain, where the species was pretty common. Mr. J. H. Gurney has ('Ibis,' January, 1876, p. 130) described the interesting phase of plumage presented by the female bird as follows:—

"Whilst on the subject of harriers I may remark that in 'The Ibis' for 1875, pp. 226—228, I published some notes on the various plumages of *C. melanoleucus*; as an addition to these, I now give some particulars of a harrier of that species, obtained in the month of March in the Darrany (Darrang) district of Assam by Major H. H. Godwin-Austen, and ascertained by that gentleman to be a female; premising that an ordinary adult male was obtained by the same ornithologist in the same month and in the same locality, and that I have been indebted to the good offices of Lord Walden for the opportunity of examining both these specimens. In this female the feathers on the entire upper surface of the head are blackish brown, with narrow rufous edgings; those of the nape are still darker, and without rufous edgings, the entire mantle is of a similar tint, increasing in intensity as it approaches the tips of the lower scapulars, which are almost black. The general hue of the mantle is apparently unbroken, except by narrow buff edgings to the upper interscapular feathers; but on lifting up the lower scapulars, the feathers which they conceal are found to be grey, barred with blackish brown, which is darkest towards the tip, and in places mottled with white on the inner web; the feathers on the rump are blackish brown, more or less tipped with white; the upper tail-coverts white, with one, or at most two, irregular brown spots in each feather; the tail grey, with six irregular transverse bars and a whitish tip, but no tinge of rufous. The under surface is marked very much as is represented in 'The Ibis' for 1874, Plate X, but with considerably more white on the abdomen, owing to the brown streaks being fewer and narrower; the thighs and under tail-coverts are also white, with a few streaks of brown, varying in both length and breadth. The wings in this specimen show a remarkable approach to the plumage of the adult male; the whole of the lesser wing-coverts are white, but with a broad sagittate mark of dark brown in the centre of each feather, the same coloration being extended over the bend of the carpal joint, and along the anterior edge of the wing to the commencement of the greater coverts; the black band which in the adult male extends from the neighbourhood of the carpal joint to the tips of the tertials, is in this specimen represented by a corresponding band of dark chocolate brown, varied by some of the brown feathers passing, in part, into a decided black, and by a few white spots in that part of the band which is near to the carpal joint; that portion of the wing which is grey in the full-plumaged male is also grey in this female, but with transverse bars of dark brown as in the ordinary plumage of male specimens of intermediate age."



"The principal measurements of this female are as follow: wing from carpal joint 15·8, tarsus 3·3, middle toe s. u. 1·45 inches."

\*71. *HUHUA NIPALENSIS*, Hodgson.

Ex. 52, L. 27, W. 19, T. 10·5, t. 3·5, Bf. 2·75, girth round thigh 5·75 inches, diameter of eyes, which are dark glass-blue with narrow brown irides, one inch, mid-toe and -claw 4·5, inner talon 2·4, ear-tufts 3·25 inches. 1st quill rather short, 4th and 5th equal and longest.

Feet dull yellow; bill pale dingy yellow.

This fine horned-owl was shot in the day-time out of one of the large forest trees now growing on the rampart of the old fort of Purtabghur, in the Darrang district; its presence having been made known by the great excitement it was causing among the other birds, who were paying it a noisy levée. The crows of course were taking the lead and two hornbills (*Hydrocissa albirostris*) were among its visitors; it had probably been sacrificing a neighbour. It is a grand and most powerfully built bird.

80. *GLAUCIDIUM BRODIEI*, Burton.

Torúpútú Peak, 7300 ft.

81 a. *NINOX NIPALENSIS*, Hodgson.

The *N. scutulata* of Raffles is the Sumatran bird (*vide* note by Lord Walden in the 'Catalogue of the Mammals and Birds of Burmah' by Ed. Blyth, J. A. S. B. 1875). The Ceylon and Malabar birds cannot be separated and must stand as *N. hirsuta*, Tem., but the Himalayan race seems to differ and we ought perhaps to adopt the title *Nipalensis*, Hodgson, for it.

85. *HIRUNDO ERYTHROPYGIA*, Sykes,

This is the *H. Daurica* of former lists.

\*94. *CHELIDON NIPALENSIS*, Hodgson.

In a clearing above Doripu, a large number were observed, and I shot a couple, much to the delight of the Daflas with me, who had never before seen a bird knocked over on the wing. A swift was also seen at the same time, but I could not get a fair shot, and they soon cleared off.

108 a. *CAPRIMULGUS JOTOKA*, Schlegel.

This bird was particularly numerous at No. 6 camp on the Dikrang. The specimens agree exactly with those I have from the Khási Hills.

109. *CAPRIMULGUS ALBONOTATUS*, Tickell.

This species has a loud hard chucking note, which it emits at decided intervals "chuck—chuck," a pause, then "chuck—chuck—chuck," another pause, "chuck—chuck," occasionally sounding it four times. *C. jotoka* may be known at once (as I noticed last summer at Shillong, where it is common) by its shorter more softened "chuck," which it repeats continuously and rapidly for long periods at a time, but only when sitting.



117. *MEROPS VIRIDIS*, Lin.

\*135 a. *ALCEDO GRANDIS*, Blyth.

A specimen of this very rare and beautiful kingfisher was shot on the Dikrang River, below Pakfi's village, where I saw one or two others. The original specimen was obtained by Mr. Blyth (J. A. S. B. XIV, p. 190) from the base of the Darjeeling Hills, probably in the Teesta valley, well within the hills. Dr. Anderson got another from the same locality; this specimen is to be found figured in Sharpe's 'Monograph of the Kingfishers,' and is now in the Indian Museum, Calcutta. I have compared the Dafla bird with it; but it is young, with the bill not fully developed, and it is to be regretted that no better example for figuring was then procurable. We failed to find Blyth's original type, but Mr. Mandelli of Darjeeling has kindly sent me a drawing to scale of the bill of one of his own specimens and it agrees exactly in size with that of my bird.

136. *CERYLE RUDIS*, Lin.

On all the large streams of the Terai.

\*137. *CERYLE GUTTATA*, Vigors.

I saw this large kingfisher several times on the Dikrang river, above camp No. 6; on one occasion four were together, but they are generally solitary. I never perceived it hovering like *C. rudis*. Its flight is very rapid.

An officer of the 42nd Assam Light Infantry shot one, and kindly made me a present of the skin.

138. *PSARISOMUS DALHOUSIE*, Jameson.

Large scattered flocks moving rapidly through the forest were seen in the Dikrang Dhún between Harmutti and the Borpani stockade, keeping to the boughs about halfway up the trees. It is curious how exceedingly well defined in these forests are the haunts of many birds. Some, such as species of *Minla*, *Actinura*, *Liothrix*, *Ixulus*, &c., never appear to descend out of the light beneath the thick canopy of leaves in the crown of the trees, but feed about on them and on the orchidaceous growth that thickly clothes the topmost boughs. Others, like the above-named *Psarisomus*, *Irena puella*, *Criniger flavicollis*, &c., keep well in the shade halfway down, while others, and particularly the fly-catchers *Chelidorhynchus hypoxantha* and *Culicivora cinereocapilla*, remain exclusively in or about the underwood, scarcely ever mounting above it into the larger trees.

The culmen in these specimens was not black (as described by Jerdon), but the bill was green above, pale orange below.

139. *SERILOPHUS RUBROPYGUS*, Hodgson.

142. *HYDROCISSA ALBIROSTRIS*, Shaw.

The commonest hornbill here; another large one with a red head, probably *Rhyticeros plicatus*, was seen in the Dikrang valley but not shot.



149. *PALEORNIS CYANOCEPHALUS*, Lin.

Narainpur. The same as the *P. rosa* of former lists.

\*152 *a.* *PALEORNIS MELANORHYNCHUS*, Wagler.

Common in the tea-garden at Harmutti.

157. *PICUS MACEI*, Vieill.

\*171. *GEVINUS STRIOLATUS*, Blyth.

From the Terai and near Dikráng múkh.

172. *GEVINUS OCCIPITALIS*, Vigors.

173. *CHRYSOPTERIS CHLOROLOPHUS*, Vieill.

176. *VENILIA PYRRHOTIS*, Hodgson.

Shengorh Peak.

Bill pale yellow; legs dull dusky green; irides dark dull red.

177. *GEVINUS GRANTIA*, McClelland.

This is called "*Koria*" by the Daflas.

178. *MICROPTERNUS RUFINOTUS*, Malherbe.

This is the *M. phaiiceps* of former lists.

187. *SASIA OCHRACEA*, Hodgson.

192. *MEGALEMA HODGSONI*, Bonap.

195. *CYANOPS ASIATICA*, Latham.

196. *MEGALEMA FRANKLINII*, Blyth.

207. *HIEROCOCCYX SPARVERIOIDES*, Vigors.

Young female,—Dikrang valley.

218. *CENTROPUS BENGALENSIS*, Gmelin.

Young male.

223. *ARACHNOTHERA MAGNA*, Hodgson.

229. *ÆTHOPYGA NIPALENSIS*, Hodgson.

Shengorh Peak, at 6000 ft. I have always found this honey-sucker ranging higher than any other of the genus.

231. *ÆTHOPYGA SATURATA*, Hodgson.

Common in the Harjúli,\* and along the outer sandstone range.

\*245. *CERTHIA DISCOLOR*, Blyth.

The specimens from the Dafla hills agree perfectly with examples in the Indian Museum, Calcutta, with which I compared them. I give the description.

Head black with a medial pale ochreous streak and another over the eye; back streaked with pale ochre and dark brown; upper tail-coverts ferruginous; tail rufous. Chin and throat dull pale brown; belly paler; under tail-coverts pale rusty; primaries black with a pale ochreous band, with subterminal spots and terminal spots on all except the first three; coverts black and spotted. Bill black above, ruddy beneath; legs horny.

L. 6.0, W. 2.75, T. 3.0, t. 0.68, Bf. 0.55 inches.

\* Júli, a ravine in the local dialect.



261. *SITTA CINNAMOMEOVENTRIS*, Blyth.

I obtained several of this species in the large trees that have been left standing in the tea-garden at Harmutti. They were haunting the holes in the stems and preparing to commence breeding. The tail is very square in this species.

252. *SITTA FORMOSA*, Blyth.

Was occasionally seen and two specimens were secured under Torúpútú Peak at about 5000 ft.

253. *DENDROPHILA FRONTALIS*, Horsf.

According to Mr. R. B. Sharpe ('Stray Feathers', Vol. III, p. 436), this bird will stand under Hodgson's name *corallina*, *frontalis* being the Malayan form, which is distinguished by the pure white colour of the throat.

254. *UPUPA EPOPS*, Lin.258. *LANIUS TEPHRONOTUS*, Vigors.263. *TEPHRODORNIS PELVICA*, Hodgson.

Darpang nulla at the base of the outer hills.

269. *VOLVOCIVORA MELANOSCHISTUS*, Hodgson.270. *GRAUCALUS MACEI*, Lesson.271. *PERICROCOTUS SPECIOSUS*, Lath.273. *PERICROCOTUS BREVIROSTRIS*, Vigors.278 *b.* *DICRURUS CATHÆCUS*, Swinhoe.

Assam birds agree very well with those from China, save that the tail is rather longer. This is included in my former list as *D. longus*, which is the title of the Javan form.

280. *DICRURUS PYRRHOPS*, Hodgson.282. *CHAPTIA AENEA*, Vieillot.

Harmutti and Dikrang valley.

283. *BRINGA REMIFER*, Temm.

In non-breeding plumage (Dec.) on the Niosi ridge near Tanir Peak, a good many seen.

284. *DISSEMURUS GRANDIS*, Gould.286. *CHIBIA HOTTENTOTA*, Lin.

Irides dark reddish brown; legs and feet black.

289. *TCHITREA AFFINIS*, A. Hay.291. *LEUCOCERCA ALBICOLLIS*, Vieillot.294. *CHELIDORYNX HYPOXANTHA*, Blyth.

Very common.

295. *CULICIPETA CINEREOCAPILLA*, Vieillot.301. *EUMYIAS MELANOPS*, Vigors.\*303. *CYORNIS UNICOLOR*, Blyth.

A single specimen of this rare fly-catcher was obtained in the Dikrang valley.



315. *NILTAVA MACGRIGORIE*, Burton.

316. *NILTAVA GRANDIS*, Blyth.

Shengorh Peak, at 6000 ft.

319. *SIPHIA STROPHIATA*, Hodgson.

A male from Torúpútú Peak, and a female from the Dikrang valley. I observe that this female differs a good deal from the description of the male, which alone is given by Jerdon. Above she is similar throughout, except that the frontal band is absent, there being a very slight pale grey indication of it. The throat is grey in lieu of black; breast and abdomen dull white, the flanks olivaceous. The rufous gorget is very pale; indeed, there is only just an indication of it.

323. *ERYTHROSTERNA LEUCURA*, Gmelin.

Irides dark brown.

Harmutti tea-garden.

343. *MYIOPHONUS TEMMINCKII*, Vigors.

344. *HYDRORNIS NIPAENSIS*, Hodgson.

350. *ZOOTHERA MONTICOLA*, Vigors.

Only one specimen was obtained. This has a very dark coloured plumage throughout, much darker than any other I have examined.

355. *GEOCICHLA CITRINA*, Latham.

366. *TURDUS (PLANESTICUS) FUSCATUS*, Pall.

Shot at Harmutti.

373. *PARADOXORNIS FLAVIROSTRIS*, Gould.

Only in the high grass of the low plain country skirting the hills.

\*378 *b. SUTHORA DAFLAENSIS*, Godwin-Austen. Plate III.

I described this very interesting little bird in the *Annals and Mag. Nat. History* for December 1875. I give below a copy of the original description, together with some account of the habits of the genus, which are quite parine. It is closely allied to *S. Manipurensis*, Wald. and G.-Aus., described in 'The Ibis', 1875, p. 250. The difference between them is most marked on the under side, the chin being grey in the Dafla bird, paling on the upper breast and belly to dull yellowish white, while in the Manipur and Nágá species the chin and throat are deep black, fading to grey on the breast and thence into the white of the lower tail-coverts. There is besides a marked difference in size, especially in the bill and legs; this new form being the smallest of the genus now known.

*Desc.*—"Above; crown of head chrome-brown, back and rump rusty olivaceous brown; tail very rich rusty brown, particularly near the base; frontal band, passing over the eye to the nape, black; a white circle round eye, with a moustachial streak passing down the side of the neck of the same colour; ear-coverts grey, surmounted by a small streak of golden yellow. Chin grey; breast and belly dull sordid white; under tail-coverts



white ; flanks grey. Shoulder of wing olivaceous ; primaries black, rufous at the base, forming a band, the outermost edged white ; their coverts black : secondaries grey, edged rich rufous on the outer web, with a narrow white edging to the inner. Irides dark brown ; legs and feet pale grey ; bill neutral grey.

"L. 3.25, W. 1.75, T. 2.10, t. 0.62, Bf. 0.25 inches.

"*Hab.* The bamboo underwood of the forests at 5000—7000 feet, first obtained on the slopes of Torúpútú Peak in January.

"These curious little birds associate together in large flocks, making an incessant sharp twitter. They are most active, flitting rapidly about the foliage of the bamboos, of which the underwood is principally composed. They were the most fearless birds I ever met with, perching on twigs within a couple of yards of one's head, so close that it was some time before I could fire at one without the certainty of blowing it all to pieces, and two specimens obtained I had to throw away. The bright-coloured top of the head, set off with its black coronal edging, is conspicuous as they fly and hop about the branches."

\*382. *GRAMMATOPTILA STRIATA*, Vigors.

This was a bird seen and heard more than any other at about 6000 feet in January. It was particularly abundant under Torúpútú Peak, associating in large flocks, their note a chatter mingled with another call somewhat simulating the low quack of a duck. On examination of several birds they proved to be fruit- and seed-eaters solely, but insect life was at the time very scarce. Irides red brown ; legs and feet pale grey.

L. 10.5, W. 5.5, T. 5.75, t. 1.75, Bf. 0.95 inches.

I have noticed in these forests that many species of gregarious babbling-thrushes associate together, and I have seen as many as three in the same large and numerous flock. The large and noisy white-crested babblers (*Garrulax leucolophus*) often have other species in their train, among others I once shot *Pomatorhinus ferruginosus*. The same habit is to be observed with many of the *Liotrichinæ* : for long distances not a bird is to be seen or heard, all is as silent as if no life whatever existed ; when suddenly one comes upon a whole assemblage of birds, all actively feeding and an incessant chirping and twittering are going on on all sides ; they pass on through the forest and all is still again.

384. *GAMPSORHYNCHUS RUFULUS*, Blyth.

One specimen possesses an incipient collar, but differs in no other respect. Mr. Hume has separated this phase or variety of colouration under the specific title of *G. torquatus*, but I doubt whether so small a variation however interesting and worthy of record is enough to entitle the bird to a distinctive title. Lord Walden has remarked to me that the collar probably denotes a full stage of plumage.





385. *PYCTORHIS SINENSIS*, Gmelin.

\*386 a. *PYCTORHIS ALTIROSTRIS*, Jerdon.

In this bird I at first considered I had got a new species, but it agrees so well with *Chrysomma altirostre*, Jerdon, described in the 'Ibis' 1862, p. 22, that I do not hesitate to identify it, although Dr. Jerdon's bird is described as from Thayet Myo on the Irrawady, Burmah, where it has not again turned up, notwithstanding that this place has since been well worked by Mr. Oates, Captain Fielden, and others. Although the paper in which Dr. Jerdon describes *C. altirostre* purports to be exclusively one on birds then lately obtained by him in Burmah, yet I am inclined to think that he may have had before him one or two species from Assam. Twice in the paper (pp. 19 and 23) he writes "Brahmaputra River" when he should have written "Irrawady", so that there is just the possibility that *P. altirostris* was from the same country where I found it so abundant, yet Dr. Jerdon in 1862 had not visited Assam and did not do so until ? 1868.\* What has become of Dr. Jerdon's type specimen I cannot ascertain, but the hoary frontal band and peculiar short bill are conspicuous characters; it will be very interesting hereafter to compare *altirostre* from Burmah, should it ever turn up there. As slight differences may exist, I give a description of the Assam bird, which I found to be by no means uncommon in the grass of the Bishnath plain. I first shot it from off an elephant near the embouchement of the Burroi River, and altogether secured four specimens, one of which, with many others in this list, I have sent to the Indian Museum, Calcutta. It is in every respect a true *Pycutorhis*. Jerdon says very rightly, it may be on only a cursory glance mistaken for *Pyc. Sinensis*, but on a more attentive examination, or on comparison with the latter, its distinctness is at once apparent.† It is a difficult bird to shoot, its habits being so very skulking, and when once frightened it will not rise again. It is also a much more solitary bird than *P. sinensis*, which associates in considerable flocks, and I never found more than two or three together.

*Desc.*—Above dark ruddy brown, brightest on the head, primaries, and outer edging of the tail-feathers; frontal band, over the eye, and ear-coverts hoary; in some specimens less white is mixed with the dark grey than in others. Chin pale grey, merging gradually on the breast into pale rusty ochre and on the flanks, belly, and under tail-coverts into ferruginous. Irides (very narrow) pale sienna; orbits yellow; bill ruddy brown, pale ruddy below.

L. 6.25, W. 2.45, T. 3.8, t. 1.08, Bf. 6.42 inches.

\* Since writing this Mr. W. T. Blanford says (*in epist.*), "I remember seeing the specimen at Thayet Myo. I was there with Jerdon, you know."

† Mr. Hume (in 'Stray Feathers', Vol. III, p. 115) refers to *altirostre*, but the birds he had under review were evidently, as he says, nothing but *P. Sinensis*.



The bill is more curved, higher, and shorter than in *Sinensis*, in which moreover it is deep black.

388. *ALCIPPE NIPALENSIS*, Hodgson.

390. *TURDINUS GAROENSIS*, G.-Austen.

I was very fortunate in obtaining a second example of this new bird and can now add the colouration of the soft parts and dimensions from the flesh, those already given (*J. A. S. B.*, Vol. XLIII, page 160) having been taken from a carbolized specimen.

L. 5.5, W. 2.5, T. 2.3, t. 1.15, Bf. 0.53 inches.

Irides red brown; legs very pale fleshy.

Proceeding through the dense underwood in the Dikrang valley, I caught sight of this bird on the narrow path about two yards from my feet, and at the first glance took it to be a small rodent. It was most fearless, and made no attempt to fly off, but caught an insect while I stood and watched it. I had to step back several yards before I could shoot it without blowing it to atoms.

391. *STRACHYRHIS NIGRICEPS*, Hodgson.

From the jungles near Harmutti, near the base of the hills,—common.

394. *STRACHYRHIS CHRYSEA*, Hodgson.

Shengorh Peak.

395. *MIXORNIS RUBRICAPILLA*, Tickell.

396 *a.* *TIMALIA BENGALENSIS*, G.-Austen.

400. *POMATORHINUS RUFICOLLIS*, Hodgson, var.

Dafla birds are similar to those from Darjeeling, but do not agree with those from Nipal and the Naga Hills, the former being very much more ruddy throughout and darker olive above. The most striking difference lies in the size of the legs and in strength of the toes and claws.

Dimensions—Dafla and Darjeeling, t. 1.25, hind toe 1.0, claw 0.60 in.

Do. Nipal, t. 1.05, „ 0.75, „ 0.45 „

\*401. *POMATORHINUS FERRUGINOSUS*, Blyth.

“*Pot gongor*” of the Daflas.

This handsome scimitar-babbler appeared very numerous under Torúpútú Peak, about 5000 feet. It is gregarious, but not a noisy bird, uttering only a faint chirp.

Irides pale greenish yellow; bill crimson; legs dull green.

L. 8.75, W. 3.5, T. 4.2, t. 1.3, Bf. 1.0 inches.

402. *POMATORHINUS SCHISTICEPS*, Hodgson.

405 *b.* *POMATORHINUS HYPOLEUCOS*, Blyth.

The specimen obtained is larger than any I have from the hill-ranges south of the Brahmaputra, but agrees in all other respects.

407. *GARRULAX LEUCOLOPHUS*, Hard.

This was found to be as numerous here as in other parts of the adjacent hill-states.



409 *a*. GARRULAX GULARIS, McClelland.

From Borpani in the Dikrang Dhún. Appears never to range higher than 2000 feet or so. It is a rare bird, and I only shot two specimens.

412. GARRULAX PECTORALIS, Gould.

413. GARRULAX MONILIGER, Hodgson.

"*Poréri*" or "*Purirhi*" of the Daflas.

416. TROCHALOPTERUM CHRYSOPTERUM, Gould.

Solitary, in pairs. Its call low.

Shengorh Peak, 7000 ft., in February.

L. 9·0, W. 3·5, T. 3·85, t. 1·5, Bf. 0·77 inches.

420. TROCHALOPTERUM SQUAMATUM, Gould.

421. TROCHALOPTERUM RUFIGULARE, Gould.

Dafla examples agree with those from Darjeeling. Individuals differ in the colouration of the wing-bar: in all Khási and Gáro birds and in one from Darjeeling this is concolorous with the coverts, *viz.*, olive-brown, the lores sometimes rufous. The normal colouration (? full) is pearly grey on the breast and white in front of the eyes. Khási examples have the rufous of the chin extending well down on to the breast.

L. 9·0, W. 3·6, T. 4·0, t. 1·48, Bf. 0·76 inches.

Bill grey above, very pale yellow below; legs and feet very pale horny; irides very dark purple-red.

Found associating in pairs, shy and not easy to find in the underwood. Their call is a sharp, monotonous kind of chirp, as they answer each other.

427. ACTINURA EGERTONI, Gould.

The specimen shot on Shengorh Peak is much more rufous than the Khási bird; this has led me to look at the series at my disposal with more attention. In my first list of birds (J. A. S. B., 1870, p. 105), the latter is recorded as a variety. I noted at the time I shot the first specimen at Asalu that it did not accurately agree with the description of *A. Egertoni* in Jerdon's 'Birds of India', and Dr. Jerdon himself, on my subsequently shewing him the bird, agreed that there were differences, but we had then no Darjeeling specimens to compare it with. I mentioned the points in which the Khási bird differed and I now see that not the least important of these is the distinct difference in the colour of the shoulder of the wing, the back, and the rump; which is an ochrey olivaceous, but in the Dafla specimen it is red-brown as given by Jerdon for the same parts of true *Egertoni*. All the birds (and I have a large series from the hill-ranges south of the Brahmaputra) are identical, and so distinct from the *Egertoni* of the Eastern Himálaya that they must receive a specific title, which I propose should be *A. Khasiana*, or, as I would rather designate races differing like this so slightly from an older well-known form, *A. Egertoni*, Gould, var. *Khasiana*; and in like manner we might indicate the relations of



such forms as *Trichastoma minor*, Hume and *Microperdix Blewitti*, Hume by calling them *T. Abbotti*, Blyth, var. *minor*; *M. erythrorhyncha*, var. *Blewitti*; and the same might be done with several other closely allied species.

427 b. *ACTINURA DAFLAENSIS*, G.-Austen. Plate IV.

Among the birds collected one of the most interesting forms is the *Actinura* described in 'Annals & Mag. Nat. Hist.' for November 1875, and of which the original description is repeated below.

"As might be expected, its nearest ally is *A. Nipalensis*, Hodgk., the colouration above being very similar on the back and tail, but with less rufous barring. The crest, however, is quite different; and in this respect the species approaches *A. Waldeni* from the Naga hills, on the south of the Brahmaputra valley, only that the crest is far fuller. The general blotchy streakiness of the throat and breast is also a mark of connexion with *A. Waldeni*. On comparison, it is seen that *Actinura Daflaensis* bears the same relation to *A. Nipalensis* that *A. Waldeni* does to *A. Egertoni*.

"The genus is a very well-marked one; and we can now record from the Indian region five species (including *A. Ramsayi* from Tonghoo, in Burmah, described by Viscount Walden in 'Ann. & Mag. Nat. Hist.' for June 1875), viz.:—1. *A. Egertoni*, Gould; 2. *A. Nipalensis*, Hodgson; 3. *A. Waldeni*, Godwin-Austen; 4. *A. Daflaensis*, Godwin-Austen; 5. *A. Ramsayi*, Walden. The last is a very distinct and interesting bird, a departure from the East-Himalayan type, but yet in every point a true *Actinura*.

"*Male*. Above; head ash-brown; feathers in front spatulate, behind elongated into a full crest, narrowly pale-edged; the ash tint pales on the back of the neck, and merges into the strong rusty brown of the back and upper tail-coverts; base of tail-feathers of the same colour, followed by four or five black bars, and the terminal half all black; the three outer rectrices tipped white, with a slight tendency to barring on the extreme outer web; side of head ash-grey, the ear-coverts with light silky reflections; shoulder of wing rusty brown; first primary coverts tipped with grey, forming a distinct narrow band, the last (covering the first seven primaries) black, forming a patch; the primaries are sienna-brown, the outermost edged with hoary grey, black on the inner webs and extremities, and narrowly barred with black on the terminal outer web; secondaries evenly and narrowly barred black and pale olivaceous umber. Beneath; the chin and throat pale dingy white, becoming a dirty ochrey ash on the breast, with a blurry striation, particularly on the throat; flanks and under tail-coverts rusty brown; tail beneath ashy black, the outermost feathers distinctly barred. Bill dark horny; legs the same; irides—?

"L. 7.5, W. 3.5, T. 3.2, t. 1.3, Bf. 0.68 inches.

"*Hab*. In high forest at 7000 feet, and first shot on Shengorh Peak in February."



\*430. *SIBIA PICAOIDES*, Hodgson.

Its range appears to extend up to about 3000 ft.

430 *a.* *SIBIA PULCHELLA*, G.-Austen.

I obtained several specimens of this bird on the slopes of Torúpútú Peak at about 5000 ft. It was first obtained by me in the Nágá Hills, and it was interesting to find it extending to this side of the Assam valley.

\*432. *MALACOCIRCUS TERRICOLOR*, Hodgson.

I have never got this bird on the south side of the Brahmaputra or in Cachar, and I did not see many even here in the Darrang district.

437 *a.* *MALACOCIRCUS (LAYARDIA) RUBIGINOSUS*, G.-Austen.

It was a great pleasure to find this bird again and in Assam, so far from the locality in which it was first discovered by me in Munipur. Beating through some grass for florikan, near Helem, in the Darrang district, some ruddy birds were flushed which quickly hid themselves low down in the stuff and could not be driven out, although the elephants were put through and through it in every direction. I suspected they belonged to the above species, but they were far more wary and concealed themselves more than those I had seen in Munipur. Several times afterwards similar birds were put up and a snap shot was obtained off the pad of the elephant as they scudded along for a few yards and dropped completely out of sight into the thick grass. The chase at last became quite exciting, as I was determined to find out what they really were. At last coming on a numerous party in an outlying patch of grass, I dismounted and, sending the elephants to be put in at the opposite end, had the piece beaten up towards me; as the birds flew across an open space where the grass had been burnt, I managed to secure a couple and so clear up the doubt that hung over their identity. I afterwards obtained, with the assistance of Mr. M. J. Ogle of the survey, two or three others. From the back of an elephant, they afford a most difficult shot: the flight is jerky, and unlike other grass haunting species, these birds very seldom when driven perch on the higher stalks before settling into the cover, but shuffle right down into the latter at once, and then continue moving through it very rapidly and out of sight, so that in a few minutes they are yards distant from the spot at which they originally alighted. When hunted in this way, they separate also and straggle in all directions; which adds to the difficulty of finding them again. I found it a far better plan not to waste time over them, but to beat on again for another flock.

439. *CHATORHEA EARLEI*, Blyth.440. *MEGALURUS PALUSTRIS*, Horsfield.444. *HYPsipETES PSAROIDES*, Vigors.

The species in my former list, (p. 106) is this, not *H. concolor*.

448. *HEMIXUS FLAVALA*, Hodgson.449. *ALCURIUS STRIATUS*, Blyth.

Torúpútú Peak. January.





451. *CRINIGER FLAVEOLUS*, Gould.

A very abundant bird in the lower ground about Harmutti and Harjuli.

460 *a.* *OTOCOMPSA MONTICOLA*, McClelland.

This bulbul was a very abundant bird in the low country.

466. *PHYLLOORNIS HARDWICKII*, Jard. and Selby.

468. *IORA TYPHIA*, Lin.

469. *PYCNONOTUS PYGÆUS*, Hodgson.

474. *ORIOLOUS TRAILLII*, Vigors.

477. *MYIOMELA LEUCURA*, Hodgson.

On Torúpútú Peak. This genus should certainly be placed near *Nil-tava*.

\*498. *RUTICILLA HODGSONI*, Moore.

500. *RUTICILLA AUREA*, Pallas.

505. *RUTICILLA FULIGINOSA*, Vigors.

Dikrang valley.

506. *CHIMARRHORNIS LEUCOCEPHALA*, Vigors.

Dikrang valley.

573. *CALLIOPE PECTORALIS*, Gould.

Dikrang valley.

530. *ORTHOTOMUS LONGICAUDA*, Gmelin.

Narainpur and Harmutti—in plains.

532. *PRINIA FLAVIVENTRIS*, Deles.

Very numerous in the shorter grass of the Terai and on the Bishnath plain.

\*534. *PRINIA SOCIALIS*, Sykes, small var.

This little bird was the most numerous wren-warbler in the Darang District, and I shot a large series of it.

I generally found them in the patches of shorter grass near the foot of the Dafla Hills from the Burroi River to the Bishnath Plain, associated with *P. flaviventris*, *Graminicola Bengalensis*, and *Pyctorhis altirostris*. Their pale rufous breasts and grey backs distinguish them at once from other species directly they rise out of the grass; they then fly with a short jerking flight a short distance, settle on a stalk for a few seconds, and then drop into the cover beneath. The specimens obtained are certainly smaller than those of *P. socialis* from Southern India, but I see little or no other distinction.

L. 5.25, W. 1.7 to 1.8, T. 2.75 to 2.8, t. 0.72, Bf. 0.4 to 0.48 inches.

Irides bright reddish brown; legs pale flesh-coloured.

Dr. Jerdon's measurements of the wing and tarsus greatly exceed the above, being 2.1 and 0.9 in. respectively.

\*535. *PRINIA STEWARTI*, Blyth.

One example of this species was obtained on the Bishnath plain.





539 *a.* *CISTICOLA MELANOCEPHALA*, And.

539 *b.* *CISTICOLA MUNIPURENSIS*, G. Austen.

542. *GRAMINICOLA BENGALENSIS*, Jerdon.

Very abundant on the Bishnath plain.

Bill nearly white below, dark horny above; irides red-brown; legs and feet pale fleshy.

L. 6.0, W. 2.25, T. 3.16, t. 0.9, Bf. 0.5 inches.

544. *DRYMÆPUS LONGICAUDATUS*, Tickell.

555. *PHYLLOSCOPUS FUSCATUS*, Blyth.

Only found in the woods of the Terai.

561. *PHYLLOSCOPUS AFFINIS*, Tickell.

Only seen in the plains.

572. *ABRORNIS XANTHOSCHISTOS*, Hodgson.

578. *ABRORNIS CASTANEOCEPS*, Hodgson.

Harmutti.

585. *HENICURUS IMMACULATUS*, Hodgson.

Dikrang valley.

L. 10.0, W. 4.0, T. 5.5, t. 1.3, Bf. 0.8 inches.

\*586. *HENICURUS SCHISTACEUS*, Hodgson.

Several specimens were obtained in the Dikrang valley. Leaving the main stream and proceeding up the bed of any of the small tributaries, almost the first bird seen would be a pair of this species, flitting with their peculiar jerking flight and settling a short way up stream on the gravelly bed. When disturbed by a shot they fly into the dense underwood and do not shew themselves again. Another pair would soon be found higher up.

Irises dark umber; legs fleshy white.

L. 10.0, W. 3.9, T. 5.5, t. 1.15, Bf. 0.7 inches.

\*587. *HENICURUS SCOULERI*, Vigors.

I first became acquainted with this very diminutive representative of the genus on the Dikrang River, where it was very numerous, flitting about the large rocks and boulders. It is not such a lover of confined overgrown ravines as its much larger allies recorded above.

Irises very dark brown; legs and feet white; the two outer tail-feathers pure white, not tipped black (*conf.* Jerdon).

L. 4.75, W. 2.75, T. 2.0, t. 0.85, Bf. 0.42 inches.

588 *a.* *HENICURUS SINENSIS*, Gould, *Birds of Asia*, Pt. XVIII.

The Daffa specimens have been compared with typical *H. Leschnaulti* from Java and with *H. Sinensis* from China, obtained by Swinhoe. The frontal patch, as noticed by Captain Elwes in his revision of the genus ('The Ibis' 1872), is not a reliable character, and the only distinction appears to be that of size, the China bird being altogether larger. My specimens





again are markedly larger than *H. Sinensis* especially in the bill; which removes them still further from the Javan race.

L. 10, W. 3.9, T. 5.5, t. 1.15, Bf. 0.7 inches.

\*590 *a. MOTACILLA HODGSONI*, G. R. Gray.

If really distinct from *M. Luzoniensis*, my specimen is evidently the above; it was obtained at Tezpur on the 27th November.

*Desc.*—Above; all sooty black, more velvety on the head, this colour extends round the sides of the neck, ear-coverts, throat, and moustachial streak from the gape; shoulder of wing a paler brown-black; quills and secondaries brown, white-edged, the latter strongly so; the primary coverts very broadly edged with white, so as to form a wing-band; a broad frontal band extending over the eye as far as the posterior limit of the ear-coverts, white; white also on the lores, chin for half an inch, and a narrow line under the eye, this colour has a tendency to replace the black on the throat and sides of the neck; abdomen and outer tail-feathers white the latter with a very narrow black edging near the base of the inner web, the next pair also white with a broader edging extending nearly to the tip.

\*592. *CALOBATES MELANOPE*, Pallas.

593. *BUDYTES VIRIDIS*, Gmelin.

Got in December at Narainpur.

596. *PIPASTES AGILIS*, Sykes.

Numerous in the Dafla clearings, attracted by the millet-crop which was being cut in December.

609. *PTERYTHRIUS ERYTHROPTERUS*, Vigors.

L. 6.5, W. 3.4, T. 1.8, t. 1.1, Bf. 0.58 inches.

Bill beneath greenish grey; legs pale flesh-coloured; irides umber.

\*612. *CUTIA NIPAENSIS*, Hodgson.

(Púting, Dafla.)

It was quite a pleasure obtaining this bird for the first time on account of its peculiar and beautiful colouration, as well as the very great difference between that of the males and females. Mr. Lister, attached to the survey party for the purpose of forming a botanical collection, was the first to bring it in to me, he having shot four one after the other out of a large flock on the same tree, the birds being apparently quite scared by the report of the gun and not flying away. It is well-known on the Darjeeling side, but I have not yet met with it south of the Brahmaputra. The males besides their different colouration are rather larger than the females.

♂ L. 6.75, W. 3.65, T. 2.7, t. 1.15, Bf. 0.68 inches.

♀ L. 6.50, W. 3.25, T. 2.42, t. 1.10, Bf. 0.57 "

Irides umber-brown; legs and feet yellow.

615. *LIOTHRIX ARGENTAUROS*, Hodgson.

616. *SIVA STRIGULA*, Hodgson.





617. *SIVA CYANUROPTERA*, Hodgson.

619 *a.* *ALCIPPE COLLARIS*, Walden.

Is very probably *Minla rufogularis*, Mandelli ('Stray Feathers,' Vol. I, p. 416) and specimens from Darjeeling must be compared. The species were described by the above gentlemen about the same time. Should the two prove identical Mr. Mandelli's title has priority. It is pretty numerous at about 3000 ft. in these hills. Mr. Mandelli's single specimen came from the Bhútán Doars. I consider the species to be a *Minla*.

Dimensions in the flesh :—L. 5·0, W. 2·3, T. 2·2, t. 0·9, Bf. 0·44 in.

\*619 *b.* *MINLA MANDELLII*, G.-Austen.

Described as below in the 'A. and M. N. H.' for January 1876.

"Above dark olivaceous, tail brown; forehead rufous, merging into the olivaceous brown of the top of the head; a white supercilium commences from above the eye, and extends to the neck, merging into some streaky buff and black feathers behind the ear-coverts; a black band surmounts the white one, but does not meet the black lores; ear-coverts sooty. Chin, throat, and upper breast buffy white; sullied white on abdomen, flanks olivaceous. Irides dark red-brown; legs and feet pale fleshy; bill grey-brown. Feathers of the head scaly."

L. 5·5, W. 2·2, T. 2·5, t. 0·95, Bf. 0·45 inches.

I named this bird after Mr. L. Mandelli, who has so successfully worked the ornithology of the Sikkim Hills, and who has described a near ally of this species. Since forwarding the communication to the 'Annals', I see that Mr. Hume (in 'Stray Feathers' for 1874, p. 447) has described a *Proparus* under the title of *dubius* which is so like my bird, that I am inclined to think the two will prove identical, in which case the specific title *Mandellii* will not stand, but I should certainly not place it in the group *Proparus*, as it is in every respect similar in form to *Minla ignotincta* and *M. castaniceps*.

Wherever I have found this and *Minla collaris*, the whole country has been covered with forest, and I should certainly not call them reed- or grass-haunters. The *Liotrichine* group is already too much sub-divided and I would not recommend the adoption of another genus for these two species as proposed by Mr. A. O. Hume under the title *Schæniparus*.

\*621. *PROPARUS CHRYSÆUS*, Hodgson.

This very lovely tit was got on Shengorh, out of a numerous flock that passed through the trees near the camp.

L. 3·9, W. 2·0, T. 1·9, t. 0·8, Bf. 0·3 inches.

623. *IXULUS FLAVICOLLIS*, Hodgson.

Shengorh Peak.

624. *IXULUS OCCIPITALIS*, Blyth.

628. *YUHINA NIGRIMENTUM*, Hodgson.

Shengorh Peak.





630. *HERPORNIS XANTHOLEUCA*, Hodgson.

Harjuli 3000 ft. up to Torúpútú Peak.

645. *PARUS NIPALENSIS*, Hodgson.

The *cinereus* of my former lists is shewn to be the Javan race by Lord Walden in the 'List of Birds of Burmah', p. 112.

647. *DENDROCITTA HIMALAYANA*, Blyth.

660. *CORVUS CULMINATUS*, Sykes.

Large numbers were attracted to Narainpur on the formation of the camp there.

663. *CORVUS SPLENDENS*, Vieillot. (*C. IMPUDICUS*, Hodgson).

In the camps of Narainpur and Harmutti only.

673. *SISSA CHINENSIS*, Bodd.

"*Pilitel*" of the Daflas.

678. *DENDROCITTA FRONTALIS*, McClelland.

683. *STURNOPASTOR CONTRA*, Lin.

688. *TEMENUCHUS MALABARICUS*, Gmelin.

702. *MUNIA ACUTICAUDA*, Hodgson.

Seen only in the plains.

706. *PASSER INDICUS*, Jard. and Selby, var.

723. *EUSPIZA AUREOLA*, Pallas.

754. *MIRAFRA ASSAMICA*, McClelland.

766. *ALAUDA GULGULA*, Franklin.

773 *a.* *CROCOPUS VIRIDIPRONS*, Blyth.

776. *OSMOTRERON PHAYREI*, Blyth.

781. *CARPOPHAGA INSIGNIS*, Hodgson.

These birds were pretty common at No. 9 camp in the Dikrang valley.

793. *TURTUR MEENA*, Sykes.

Harmutti.

803 *a.* *POLYPLECTRUM TIBETANUM*, Lin.

Not so plentiful as in the hills south of the Brahmaputra, Mikir, Naga, &c.

811 *a.* *GALLOPHASIS HORSFIELDII*, G. R. Gray.

Occurs at the base of the hills.

812. *GALLUS FERRUGINEUS*, Gmelin.

Found all along the Terai, but did not appear to be very abundant.

818. *FRANCOLINUS VULGARIS*, Stephens.

Plenty were seen on the Bishnath plain.

823. *ORTYGORNIS GULARIS*, Temminck.

Very plentiful, in the high grass plains, near water, but far oftener heard than seen. They are very difficult to flush, and I have more than once, when sitting on the pad of the elephant, seen them crouching in the





grass close to the elephant's feet and not rising until actually kicked up.

825. *ARBORICOLA RUFIGULARIS*, Blyth.

"*Pokhú*" Dafla.

This was the only species obtained, and it was very common at 4000 feet and upwards at our camp in the forest under Torúpútú Peak, and the Dafla guides snared several. The Daflas, like the other hill-tribes, are clever at this art, and the mode of capturing pheasants and partridges is simple and worth describing. As it is the habit of the birds to get down low at night into the warmer ravines and feed upwards along the crests of the spurs, they stop the progress of the covey by a zig-zag barrier about 2 to 3 feet high, made up of twigs and short pieces of bamboo stuck into the ground, which is rapidly formed and extended a short distance down the hill on either side. A narrow opening is left here and there, generally at the re-entering angles, and in this the noose is set just above two cross sticks and in the same plane, at exactly the height of the bird's breast. The noose-string is made of a thin strip peeled off the outside of a bamboo, and tied to the end of a pliant stick, drawn down like a spring, and hitched into a saw-nick in a bamboo peg, into which the flat form of the string forming the noose fits close and accurately. All the materials grow on the spot, and in a few hours hundreds of barriers and snares can be made and set. The birds are often caught alive by the legs, and I had one thus captured for several days, but it refused food and died; it was probably in some way injured, for they are not difficult birds to keep in captivity, and large numbers are brought to Calcutta for transfer to Europe.

831. *EXCALFACTORIA CHINENSIS*, Lin.

\*838. *SYPHEOTIDES BENGALENSIS*, Gmelin.

Numbers are to be seen on the Bishnath plain. In the early morning they are constantly on the move, taking long flights from one feeding ground to another, and are then very wary; as the heat increases, they lie very close and are often difficult to flush, and if the sportsman is on foot, they will hide and often elude him altogether. I found the best plan was to walk along about 50 yards in front of the elephants when the grass would admit of it.

870. *GALLINAGO STENURA*, Kuhl.

905. *GALLINULA CHLOROPUS*, Lin.

917. *MYCTERIA ASIATICA*, Lath.

Often seen in the Darrang District, and I shot a fine specimen. I once saw this bird breeding in the extensive marshes near Shushang, Mymensing, in January. It had formed its nest on the top of a thick bushy mass of trees about 30 feet high, which stood in the midst of a dense thicket of a species of rose, so thick that the elephants could not push into it, and it





was practically inaccessible. The nest consisted of a very large accumulation of sticks and reeds.

931. *BUTORIDES JAVANICUS*, Horsfield.

On all the large wooded rivers and streams.

\*981. *LARUS RIDIBUNDUS*, Linn.

This bird, which Mr. Howard Sanders has kindly identified, was shot near the junction of the Dunsiri and Brahmaputra in December. From the colour of its bill and legs it rather puzzled me, for I was well acquainted with *brunneicephala*, which is a common gull on the above river. It is interesting finding the laughing-gull so far up the Brahmaputra, at this point some 500 miles from the sea. Jerdon mentions its being abundant at the mouths of the Ganges.

\*987. *STERNA MELANOGASTRA*, Temminck.

A very common tern on the Brahmaputra and its larger tributaries, such as the Dikrang, as far up as sand-banks occur.







IX.—*On the Physical Geography of the Great Indian Desert with especial reference to the former Existence of the Sea in the Indus Valley; and on the Origin and Mode of Formation of the Sand-hills.*—By W. T. BLANFORD, F. R. S.

(Received June 31st;—Read July 5th, 1876.)

CONTENTS.

- § 1. Introduction.—Geological distinction between the Indian Peninsula and the neighbouring portions of Asia.
- § 2. Zoological Relations between India and Africa.
- § 3. The Indo-gangetic Plain between India and the adjoining regions of Asia.
- § 4. Physical Characters of the Desert. Botany and Zoology.
- § 5. Distribution of the Sand-hills.
- § 6. Evidence of subrecent Marine Action. Salt 'dhandhs.'
- § 7. Marine Mollusk living in Salt Lakes.
- § 8. Former existence of an Inlet of the Sea in Eastern Sind. The Ran of Kachh.
- § 9. The Luni Basin.
- § 10. Want of evidence of Marine Denudation elsewhere in the Desert.
- § 11. Nature and Origin of the Sand-hills.
- § 12. Source of the Sand.
- § 13. Conclusions.

§ 1. *Introduction.*—*Geological distinction between the Indian Peninsula and the neighbouring portions of Asia.*—There is no tract of country in India more singular in its character than that which is commonly known as the Great Desert, lying on the eastern side of the Indus between Sind and Rájputana. The peculiar nature of the region has often been described, but there are still some points in its physical geography which appear to require explanation, and which are not, I think, entirely cleared up in the best account of the region with which I am acquainted, that given by Sir H. B. E. Frere in the Journal of the Royal Geographical Society for 1870, Vol. XL, p. 181. To these points, which chiefly refer to the origin of the sand-hills, I shall advert in the sequel.

The physical geography of a country is always intimately connected with its geological construction and history, and from this point of view the Great Desert is a tract of peculiar interest. It is almost a truism at the present day to state that India proper has no geological connexion with the surrounding countries. The whole geological history of the Indian peninsula, from the date of the earliest sedimentary formations, shews scarcely a trace of similarity to that of the Himalayas\* or the countries west of the Indus or east of the Bay of Bengal. Wherever remains of sedimentary beds are found throughout the peninsula, of any age from the

\* The only exception of any importance is the occurrence of Damuda rocks in Sikkim and Assam.



dawn of organized life to the present day, they consist with but few and local exceptions of rocks which have been formed, in all probability, on the surface of the land; the only case of a marine formation known to exist at a distance of more than 100 miles from the present coast being that of the thin Cretaceous band at Bágh, Barwai, and elsewhere in the western part of the Narbadda valley. On the other side of the great alluvial plain formed by the Indus and Ganges all is different. Marine rocks of various ages form the hills of Sind and the Panjáb, the greater portion of the Himalayas and Tibet (so far as the mountains do not consist of metamorphic rocks), the ranges south of the Assam valley, and the hills of Arrakan and Burmah. Only the later tertiary deposits in Sind, the Panjáb, Northern India, Assam, and Burmah are, as a rule, of subaërial origin and accumulated by the action of fresh water, whilst in Sind there is distinct evidence that the sea covered the greater portion, and very probably the whole, of the country as late as the Miocene epoch.\*

§ 2. *Zoological Relations between India and Africa.*—The curious points of connexion between the existing fauna of India and that of Africa and the Mascarene islands bear out the idea of India having formed in past times a portion of a great tropical continent. There also seems a probability, as might have been anticipated, that at different geological periods the distribution of land in this continental area varied, and that different portions were in union with each other. Leaving aside the remarkable evidence afforded by the Mesozoic (and Upper Palæozoic?) floras, amongst which identical species have been found in Australia, Southern Africa, and India, there appear to have been three distinct Tertiary and recent migrations of African types into India, or perhaps it would be more correct to say, that animals having affinities with those now inhabiting Africa have entered India in three different groups, two of which are older immigrants than the other. The first consists of the types common to the Malay countries, India, and Africa, which form a very large proportion of the fauna: such as certain monkeys and lemurs, the *Tragulidæ*, *Viverræ*, *Herpestes*, *Manis*, and *Nectarinidæ*, *Dicruridæ*, *Oriolidæ*, *Pittidæ*, *Bucerotidæ*, *Ploceinæ*, *Megalaiminæ*, &c., &c., &c., *Varanidæ*, *Agamidæ*, &c.† As a rule the African and Indian genera are distinct, but exceptions occur, as in *Viverra*, *Herpestes*, *Manis*, *Zosterops*, *Varanus*, &c. Many of these forms extend to Australia.

The second group consists of forms common to India and Africa but not found east of the Bay of Bengal nor yet in Arabia or Persia, such as *Antilopidæ* (exclusive of *Gazella*), *Mellivora*, *Chicquera*, *Sypheotides* (= *Lissotis*),

\* Records Geol. Surv. Ind. IX, p. 15.

† See for fuller details 'Africa-Indien' by A. v. Pelzeln in Verh. Zool.-Bot. Ges. Wien, 1875, p. 33.



*Rhinoptilus*, the family *Cyclostomidæ*, &c. With many of these the genera are different in India and Africa, though less frequently than in the first case, or, which is more to the purpose (for genera are often artificial, and depend upon human fancy quite as much as natural laws), the amount of divergence is less. The third group comprises forms which are found in Northern Africa Arabia, Persia, and India, but which do not extend to the Malay countries, such as *Hyæna striata*, *Canis aureus*, *Felis leo*, *F. jubata*, *F. chaus*, *Gazella*, *Gerbillus*, *Pterocles*, *Pyrrhulauda*, *Cursorius*, *Saxicola*, &c. In this case the genera and very often the species are identical. Many of the forms are also found in the neighbouring portions of the boreal or palaearctic region, and their number diminishes in India itself to the eastward and southward, whilst but few are found in forest. The forms belonging to this category appear to be recent immigrants.

§ 3. *The Indo-gangetic Plain between India and the adjoining regions of Asia*.—Thus both from geological and zoological evidence we have reason to conclude that the union of the Indian Peninsula with Central and South-western Asia is of comparatively late date, and it becomes a question of great interest to ascertain so far as possible the evidence of their own condition in the later geological epochs afforded by the tracts of flat country intervening between the peninsular area and the surrounding regions. These tracts consist chiefly of the great plains through which the Ganges and Indus flow to the sea, and the surface is covered to so great a depth by alluvial deposits from those rivers and their tributaries that very few traces can be found of the geological history of the country. It has been assumed by some writers that this great plain remained part of the sea long after the Himalayas had been elevated. This is not impossible, but so far as the Gangetic area is concerned I fail to see that there is evidence in favour of the view; and I think the idea is mainly due to the Pliocene Sevalik deposits having frequently been considered marine, whilst it is more probable that they are really of freshwater and probably subaërial origin, for not a single marine organism has been detected in them, whilst freshwater shells have been found in them in places. Even without entering into the question as to whether the whole Indo-gangetic plain has been covered by the sea in late geological times, the question arises whether the Indus plain, in which we have the latest evidence of marine life, has been thus covered. This is a speculation of Mr. Andrew Murray, proposed to account for the presence of a dolphin in the Indus and Ganges, and for the difference of the species inhabiting each.\*

\* *Geographical Distribution of Mammals*, p. 214. Mr. Murray's theory is briefly the following. The dolphin inhabited an arm of the sea which became a lake through the rise of land, and which was gradually rendered fresh by streams falling into it and cutting their way to the sea, first in the direction of the Ganges, secondly through



During a recent traverse of the desert, I have tried to find evidence of its condition in late geological times, and although the result is mainly negative, some facts appear to point to a recent condition of things when the sea did flow some distance up the Indus valley. At the same time I have not met with any evidence in favour of the view that the great plain of the desert has recently emerged from the sea. The route followed was from the Indus near Sehwan, viâ Umarkot in the Thar and Parkar district of Sind, to Bálmir, and thence to Jodhpúr in Rájputana, returning from Jodhpúr, viâ Jaysalmír, to Rohri on the Indus.

§ 4. *Physical Characters of the Desert. Botany and Zoology.*—It is as well before entering further into the subject to point out the chief peculiarities of the Great Desert. The term conveys an imperfect idea, because the tract of country is neither barren nor uninhabited; it is covered with shrubs and bushes in general, and in places small trees are found; moreover, although the population is thin, villages are scattered throughout, and immense herds of camels, cattle, sheep, and goats are kept and pastured. The desert is, in fact, a great sandy tract entirely destitute of streams of water, and with but few hills of rock, and a large portion of the surface consists of sand-hills of considerable height and is known locally as Thar (Thurr). When rain falls, crops of bájri (*Holcus spica*) are raised. When rains fail, the population lives principally on the milk of cattle and on imported grain.

Throughout the sandy tracts the vegetation\* consists mainly of four plants known as *Phog* (Sindhi *Tob*) (*Calligonum polygonoides*), *Bhúi* (Sindhi *Bahúsa*) (*Aerva Javanica*), *Lána* (*Anabasis multiflora*), and *Mart*, a coarse grass growing in tufts. *Lána*, although very common in some places, is rare or wanting throughout large tracts. *Phog* and *Bhúi* are peculiar to the sand-hills themselves; *Mart*, besides abounding on the sand-hills, covers the large sandy plains, which in many parts extend for miles. It is a coarse grass with a hard woody stem, and appears to be one of the principal plants eaten by cattle and horses. Another common plant on the sand-hills is *Kíp* (*Orthanthera viminea*). Between the sand-hills *Madár* (*Calotropis procera*), *Pilú* (Sindhi *Kabar* or *jár*) (*Salvadora Persica*), *Kejri* (*Acacia rupestris*?), *Kiril* (*Capparis aphylla*), *Ber* (*Zizyphus jujuba*), and a few other plants are com-

the Indus after the Ganges had been cut off from the lake by another rise of land. He considers that by this means a marine dolphin has become converted into *Platanista* and then the animal has been transferred to the second river after being cut off from the first. The question of the origin of *Platanista* it is unnecessary to discuss; the migration of the original form from one river to the other has probably been due to some of the tributary streams, such as the Satlej or Jamna, being transferred from one drainage-area to the other. This would be effected by a very trifling change of level.

\* I am indebted to Dr. King for the identification of these plants; of some, as *Mart*, I unfortunately did not take specimens.



monly found. After rain it is said that numerous herbs spring up, and a grass called *Brút* (? *Centhrus biflorus*), the spiny seeds of which have a most unpleasant habit of attaching themselves to one's clothes like burs. These seeds, divested of their spiny covering, are used for food, and are made into a kind of bread.

As might be anticipated, the desert fauna is poor, and in the sandy tracts is entirely confined to animals which never require water. Hyænas are met with in the more hilly parts but not, I think, amongst the sand-hills; wolves (*Canis pallipes*) and jackals are more common. The only carnivorous animal, however, which is universally found, is the desert fox (*Vulpes leucopus*); *V. Bengalensis* is also met with, but less abundantly. The caracal (*Lynx caracal*) is said to be common, but the only wild cat I saw was, I believe, *Felis torquata*, and I never succeeded in shooting one. None of the larger carnivora are found, though a leopard may occasionally straggle across to the hills of Bâlmîr or Jaysalmîr. The mammal of the desert *par excellence* is the desert jerboa-rat (*Gerbillus Hurrianæ*\*), which exists in almost incredible numbers, the whole surface of the sand-hills being dotted over with the entrances to its burrows. Over thousands of square miles, the number of burrows probably exceeds on an average one to every square yard. There can scarcely be a doubt that this little animal—which is a pretty little creature of a greyish tawny colour, with rather long hind legs, a rounded head, and a long hairy tail—would in most countries furnish an important item of food, for it is purely herbivorous, living chiefly on seeds and roots. Besides furnishing food to the foxes and wild cats, this rat is the prey of buzzards and of many of the other raptorial birds. No other rodent is found in the sand-hills; I did not even see a hare, though the Sind representative of the genus (*Lepus Dayanus*) is common in the hilly tracts, whilst the only ungulate found in the Thar is the Indian gazelle (*Gazella Bennetti*).

Thus it may be said that the only common mammals of the sand-hills are the fox, gerbil, and gazelle, and all these, I believe, can live without drinking. I am certain that the two latter never drink. The birds are more numerous. The common falcon is *F. jugger*, but I believe I saw *F. sacer* also. *Aquila fulvescens* abounds in places and I met with *Circæus gallicus* occasionally. But the most common raptores are the desert buzzard (*Buteo ferox*) and kestrels. Vultures, Neophrons, and kites are chiefly seen about villages. Owls are not common: I twice came across flocks of the short-eared owl (*Otus brachyotus*), and I occasionally found *Athene Brahma* and once *Scops Brucei*.

The bee-eater (*Merops viridis*) is found generally distributed. Swallows are occasionally seen; swifts (*Cypselus affinis*) are very local as usual. Goat-

\* *G. erythrorus*, Gray, *apud* Jerdon, but true *G. erythrorus* is a different species, Zool. Persia, p. 70.



suckers are extremely rare. Shrikes are represented by *Lanius lahtora*, which is common and the only species noticed amongst the sand-hills. *Dicrurus albirictus*, the common king-crow, is found everywhere, and two bulbuls (*Otocompsa leucotis* and *Pycnonotus pusillus*) are occasionally met with, the latter, contrary to what might have been expected, inhabiting the sand-hills quite as often as the former, if indeed it be not the commoner form. The striated babbler (*Chatorhea caudata*) is very abundant everywhere. *Franklinia Buchananii* is not uncommon. *Drymæca gracilis* is rare. *Sylvia curruca* is frequently seen, but both *S. Jerdoni* and *S. nana* are of exceptional occurrence. The *Phylloscopi* are of course very rare in this treeless region. The common *Saxicola* is *S. picata* throughout the whole desert; *S. deserti* is not rare, but *S. isabellina*, so abundant in parts of Sind, keeps as usual to the more fertile tracts. I saw *S. chrysopygia* occasionally, and it was more common about the middle of March, when like other *Saxicolæ* it was migrating to the north. *S. opistholeuca* and *S. morio* I only noticed about Jodhpur or between that town and Jaysalmir. *Pratincola Indica* (v. *rubicola*) was occasionally seen even amongst the sand-hills, *P. caprata* only in the more fertile tracts. *Thamnobia Cambayensis* was generally met with throughout the region. A stray *Motacilla alba* or *Budytes melanocephalus* was now and then seen near wells, and the pipits were poorly represented by the occasional occurrence of *Anthus campestris* and *A. sordidus*.\*

Larks are more abundant and the commonest species by far is the finch-lark, *Pyrrhulauda melanauchen* (*P. affinis*, Blyth), the very existence of which in India was scarcely known until quite recently. I was surprised to find *Mirafra erythroptera* by no means uncommon in the Thar, although it is unknown in Sind. *Galerita cristata*, *Melanocorypha bimaculata*, and *Calandrella brachydactyla* are also found, the two latter in flocks. The first is common, the other two far from rare. *Passer indicus* occurs everywhere of course, though preferring the neighbourhood of cultivation. *Gymnoris flavicollis* is usually found where there are trees. I once or twice saw *Emberiza Huttoni*, but *E. striolata* is found on all rocky hills. *Munia Malabarica* is common. Ravens (*Corvus corax*) are seen everywhere, the two common crows (*C. Vaillanti* and *C. impudicus*) only about cultivation. *Pastor roseus* is occasionally common, even amongst the sand-hills, but the two forms of maina (*Acridotheres tristis* and *A. ginginianus*) are only seen about villages. Doves are represented by *Turtur Cambayensis* and *T. risorius*, common everywhere, whilst the common wild pigeon (*Columba intermedia*) breeds in all wells. On the sand-hills I saw no sand-grouse; they only occur where water is procurable, but they occasionally drink at wells: the only common species is *Pterocles exustus*, but *P. arena-*

\* *A. Jerdoni*, Finsch, *A. griseo-rufescens*, Hume. I find Mr. Blyth was right in uniting the Indian bird with the African form.



*rius* and *P. Senegallus* are met with in places. The grey partridge (*Ortygornis Pondiceriana*) is found everywhere, whilst the cream-coloured courser (*Cursorius gallicus*) and the Indian bustard (*Eupodotis Edwardsi*) are pretty generally distributed.

The common birds in the Thar are *Falco jugger*, *Tinnunculus alaudarius*, *Buteo ferox*, *Merops viridis*, *Pycnonotus pusillus*, *Lanius lahtora*, *Dicrurus albirictus*, *Chatorhea caudata*, *Sylvia curruca*, *Saxicola picata*, *Thamnobia Cambayensis*, *Pyrhulanda melanauchen*, *Galerita cristata*, *Passer Indicus*, *Munia Malabarica*, *Corvus corax*, *Turtur Cambayensis*, *T. risorius*, and *Ortygornis Pondiceriana*.

The only common reptiles are lizards and they appear for the most part to hibernate in the cold season. The most abundant is *Acanthodactylus Cantoris*; I also found *Agama agilis* very common between Jaysalmir and Rohri. In the same district peculiar vermiform tracks abounded of a small lizard which I have no doubt is *Sphenocephalus tridactylus*, but this animal is nocturnal and a burrower, and although I often searched for it, I never succeeded in finding it. On more rocky ground I found *Ophiops Jerdoni* and *Mesalina pardalis*. The only harmless snakes which I saw were forms of *Zamenis* and *Psammophis*, and the only venomous species was *Echis carinatus*. No tortoises were seen or heard of.

§ 5. *Distribution of the Sand-hills*.—The sand-hills have a somewhat peculiar distribution. They occupy a large tract in Eastern Sind, extending the whole length of the province, along the edge of the Indus alluvium. Here they are close together and form long ridges, running nearly north-east and south-west near Umarkot, and about north-north-east to south-south-west near Rohri.\* In the southern portion of the desert, they are said by Sir B. Frere to run nearly east and west. They are much higher to the southward than to the north, but I saw none approaching the heights of 400 to 500 feet, said by Sir Bartle Frere to be common in parts of the desert.† The highest sand-hills which I observed near Umarkot, cannot, I think, have exceeded 200 feet, but I did not measure them, so I may be in error. This tract on the borders of Sind is the "Thar"—a name which is, in the country, restricted to the sand-hill region. From the Sind frontier to Bálmir, although there are many sand-hills, they are far from being as generally distributed as they are to the westward, whilst east of Bálmir they are, for some distance, only dotted over the surface, but they again become more general before reaching the Lúni river, and the hills, in this direction, appear to form part of a sand-hill tract which stretches to the northward

\* The change in direction is shown on the revenue survey map, on which the general course of the ridges is indicated.

† I was told that the highest sand-hills are found more to the southward between Umarkot and the Ran of Kachh.



or rather to north-north-east in the direction of Bikanir. The hills in this tract are not in such regular ridges as they are to the westward, but here also they appear to diminish in height and to become more scattered to the north. Between Jodhpur and Pokarn this eastern belt of sand-hills is only about 40 miles broad. From some distance east of Pokarn to Jaysalmir, and again for 50 miles west of Jaysalmir, the country is an undulating sandy plain, but there are very few sand-hills. I have no personal knowledge of the desert north of Jaysalmir. Stripped of the sand-hills the country would be a vast plain, slightly elevated above the sea, and only broken by isolated hills to the southward, by the somewhat more numerous ranges near Balmir, by low plateaux of sandstone towards Jodhpur and Pokarn, and by terraces of Jurassic sandstone and limestone around Jaysalmir. The hilly regions are less sandy; occasionally even torrent-beds are found near the hills, but they are soon lost in the sand.

§ 6. *Evidence of subrecent Marine Action.* Salt 'dhandhs.'—It is impossible for any geologist to traverse this region without the suggestion forcing itself upon him that this may be an example of Professor Ramsay's planes of marine denudation. Such was my first impression. But I could only find one circumstance, the general saltiness of the ground, in confirmation of this view. Every here and there throughout the desert is a smaller or larger plain of salt ground or "ran", which is said to become a shallow salt lake after heavy rain. From such places salt is sometimes extracted, but the quantity is small, and not more than might, very possibly, result from the gradual concentration of the salt distributed in small quantities throughout the soil. The water in the wells is very often brackish, but this is equally the case in countries which shew no trace of having been recently covered by sea water. There is, however, a very remarkable quantity of salt in two localities which I visited, and in one of them there is, I think, good evidence of the former neighbourhood of the sea.

To take the more important and the more interesting first. North of Umarkot the boundary of the Indus alluvium and of the Thar or sand-hill area is formed by a river known as the Narra or the Eastern Narra,\* which derives its water from floods in Bahawalpur and the Rohri district of Sind, and has of late years been artificially supplied by a canal cut from the Indus at Rohri. On the east of the Narra rise high ridges of sand with the usual NE to SW direction, and between these ridges are deep valleys filled with water and known as 'dhandhs.'† Some of these 'dhandhs' are said to be unfathomable;—and doubtless they are so by an ordinary pole

\* The Sindhi form, I believe, of the common Hindi *Nala*, a river channel, ravine, or ditch.

† *Dhandh* in Sindhi is the equivalent of *jhal* in Hindi and is applied to any pool of water or to a marsh.



or bamboo, the only instrument likely to have been used in general for sounding. Sir Bartle Frere says that he has been assured that the depth of one has been measured and found to be 70 feet.\* This shows of course considerable depression below the level of the Indus alluvial plain, for the Narra, which must of course be a little below the average level of the plain, supplies, or used to supply, the water for the 'dhandhs' in its immediate neighbourhood.

There are, however, a large number of small lakes isolated amongst the sand-hills and not in communication with the 'dhandhs' fed by the Narra, and these isolated lakes are all salt; those farthest from the Narra being apparently the most saline, and some being so concentrated that salt crystallizes on their margins. All these salt 'dhandhs' appeared to me to be at a lower level than the freshwater lakes, and this view was confirmed by my finding that small streams fed by springs amongst the sand-hills enter in many cases at the western edge of the salt 'dhandhs', and that where, as not unfrequently happens, there are more than one 'dhandh' in the same hollow, a stream often flows from the western pool to that lying more to the eastward. Now the water can only be derived by percolation through the sand from the freshwater 'dhandhs' to the westward: it is true that springs often rise from the margin of the latter, and that these springs are sometimes above the surface of the lakes, but they are usually below, and if higher they are not so far above as in the case of the salt lakes to the eastward, on the edge of which I found springs issuing from the ground 15 or 20 feet above the water.† It is a natural conclusion that the original surface of the ground at this spot was not higher than the bottom of the 'dhandhs' are now, that it was much lower than the present alluvium of the Indus, and that the Indus plain has been raised to its present height by the accumulated silt deposited from the river since the 'dhandhs' have been cut off and isolated by the sand-hills.

§ 7. *Marine Mollusk living in salt lakes.*—One more observation gave the clue to the original conditions of the ground. I found in some of the salt lakes in which the water, although very salt, was rather less so than that of the ocean, a living mollusk which has been identified by Mr. Nevill with *Potamides (Pirenella) Layardi*, H. Ad. This species inhabits the salt water of back-waters or lagoons and harbours: it is not found to the best of my belief on open coasts, nor yet in the brackish water inside the mouths of rivers, and although, like most other forms of *Potamides*, it is rather

\* J. R. G. S. XI, p. 189.

† The springs on the edges of the freshwater dhandhs are doubtless due to the water which percolates into the sand when the dhandhs are at their highest level from floods brought down by the Narra.



estuarine than truly marine, its habitat is always in water nearly if not quite as salt as the sea. The specimens which I obtained are precisely like those now living on the coast of India. Several cases are known of marine animals (chiefly vertebrata or crustacea, however) found living in freshwater, and apparently descended without change from ancestors which inhabited the same tract when it was part of the sea, but it is rarer to meet with a marine or estuarine mollusk living on unchanged in inland salt lakes without an outlet, at a distance of 150 miles from the sea and of 100 miles from the nearest point to which the tide reaches. The conclusion to be drawn from the existence of this mollusk is unmistakable: it must have inhabited the tract now occupied by the sand-hills and their enclosed 'dhandhs' when that tract was in direct communication with the sea, and probably when it formed part of a large lagoon.

§ 8. *Former existence of an Inlet of the Sea in Eastern Sind. The Ran of Kachh.*—Two further conclusions follow as corollaries, the first that the saltiness of the soil or subsoil is due to this tract of country having been the bed of the sea, or of an inlet, the second that the sand-hills must have been formed on the margin of the lagoon, and that probably the lagoon was partly filled up and isolated by accumulations of blown sand.

About 100 miles to the south of Umarkot lies the Ran of Kachh, an immense salt plain covered by salt water when the sea, driven up into it by the south-west monsoon, ponds back the more or less brackish water brought down by the Lúni and the few streams which run in from the hills of Kachh. Various theories have been proposed to account for the Ran. It is commonly considered an area of upheaval, a raised sea bottom. This is the view taken by Captain Grant and by my friend Mr. Wynne\*, although both speak also of its silting up. I had an opportunity of seeing a portion of the Ran in 1863 and I wrote of it (in 1867†) "I am disposed to consider (the Ran) the bed of an inlet of the sea filled up by the accumulation of detritus brought down by the rivers. It is just at present in the debatable state, water part of the year, land another part . . . . . of course the whole may be an area of depression, but further proofs of this are necessary than the fact of a small portion having been sunk and another part raised by the earthquake of 1819."

It must be borne in mind that there is evidence of slight elevation at several places on the coast of Western India; such has been noticed in Sind, Káthiáwád, and on the borders of the Ran itself, and the area of the Ran has doubtless shared in the general rise. So far I agree with other observers; but if I understand them correctly, I infer that they rather regard the Ran as an area of special upheaval, and in this I cannot concur.

\* *Memoirs Geol. Surv. India*, IX, pp. 21, 28.

† *Ibid.* VI, p. 31.



The probability is that Kachh was originally an island\*, and the Ran a vast inlet of the sea, which gradually became shallow, just as other inlets on the coast of India, *e. g.* Bombay harbour, are gradually being filled up by silt deposited from rivers, aided, in the case of the Ran, by blown sand and also by the gradual elevation of the whole area, and (which is the most important point in the present discussion) that this inlet extended into the region now forming Eastern Sind to a distance of at least 100 miles and probably much further. I have no precise information as to the distance to which the salt 'dhandhs' extend to the northward, but they are certainly found in the Khairpúr territory, and I find one marked on the map in Rohri, whilst there is a tract of country between Jaysalmír and Rohri in which wells of freshwater are excessively scarce and local. West of Umarkot the wells are brackish for about 35 miles; further east than this rock is found in the wells and the water is sweet. The spot where the change takes place may mark the limit of the former inlet.

§ 9. *The Lúni Basin.*—We thus have proof that an arm of the sea ran for a considerable distance up the Indus valley in very late geological times, although it is not yet manifest how far it extended, and the question arises whether there is any reason for inferring the former existence of the sea in any other part of the desert area. I have already mentioned a second locality which I had an opportunity of examining, and where salt is found in large quantities. This is near a town called Panchbhadra, a short distance north of the Lúni river and about 45 miles south-west of Jodhpúr. Here salt is largely manufactured in a slightly depressed tract of country, which may formerly have been the bed of a salt lake, but is now surrounded and partly covered by drift sand. Salt must abound throughout the lower course of the Lúni, for the water of the stream in the dry season is very strongly impregnated. It is not merely brackish, it is decidedly salt. The fall of the river is said to be very small, but of this I had no means of judging personally. If it be the fact, the river's course below Panchbhadra may very possibly have been an arm of the sea in recent times.

It is impossible to avoid speculating on the origin of the salt in the Sámbar lake being also connected with the former extension of the sea.

§ 10. *Want of evidence of Marine Denudation elsewhere in the Desert.*—Apart from the evidence afforded by the abundance of salt and the remarkable existence of a marine shell in the salt 'dhandhs' of the Thar, I searched in vain for evidence of recent marine action in the desert. The general flatness of the area may be due to marine denudation, but it may also be due to the extreme flatness of the rocks and the absence of disturbance.

\* The distribution of the Tertiary rocks in Kachh is quite consistent with the view that this tract formed an island in Eocene times, when we know that the Indus valley, Balúchistán, and Southern Persia were beneath the sea.



Except near Bálmir, where there are some craggy hills of ancient formations, and where the sandstones of Mesozoic age resting upon the older rocks dip at high angles, the sedimentary beds found preserve almost perfect horizontality. The low cliffs of sandstone near Jodhpúr, and those of sandstone and limestone near Jaysalmír, are palpably scarps of subaërial denudation, for they correspond precisely, over miles of country, to the outcrop of the harder beds; nowhere is a characteristic marine cliff, cutting through different strata, to be met with, nor is there any evidence of marine action, so far as I can see, around the isolated hills of Bálmir. Whilst therefore there is a probability that the sea did extend up the Indus valley and a possibility that it may have stretched up the Lúni basin, and from one side or the other have reached the Sámbar salt lake, there is no evidence that it covered in recent times the central area of the desert about Bálmir and Jaysalmír.

§ 11. *Nature and Origin of the Sand-hills.*—I have already described the general distribution of the sand-hills, and I have said that I am unable to coincide with Sir Bartle Frere's views as to their origin. He compares them to the ridges of rock found in Sind, and suggests that they may be due to earthquake-action. He points out that the Allah Bund, which is known to have been caused by an earthquake, is "a perfect outlying specimen of a typical Thar sand billow of moderate height", and he discusses the mode of formation of sand-ridges by the wind and gives his reasons for believing that the ridges of the Thar are not due to wind-action. To some of these reasons I shall revert presently. Meantime, I think Sir B. Frere has overlooked some phenomena of sand-hill formation. At the same time none of the works I have been able to consult throw any light upon the parallel sand-ridges of the Thar, of which I confess I am unable to offer a satisfactory explanation. I think, however, that there can be no doubt that all are due to wind-action alone, and I will give my reasons after describing the peculiarities presented.

The sand consists chiefly of small grains of quartz, mixed with felspar and hornblend in smaller proportions, other minerals only occasionally occurring. The grains are mostly rounded, precisely as in the sand of rivers or of the coast, and they are tolerably uniform in size.

I have already mentioned that the sand-hills form long ridges, with a very uniform general direction, along the edge of the Indus alluvium, where they are highest, and where the country is completely covered by sand, and that they are less regular in their direction more to the eastward. But there is one character which they preserve in both localities, though it is much more strongly marked to the eastward, and this is a tendency to terminate abruptly with a steep face towards the north-east. The long north-east to south-west ridges have as nearly as possible the same slope on both



sides, but they often end in a higher point at their north-eastern extremities. The scattered hills east of Bálmir are always highest to the north-east and slope away very gradually to the south-west. The sand-hills as a rule are evidently of very great antiquity; they often shew evidence of denudation from the action of rain, and sometimes they are worn into ravines several feet in depth. When it is considered how small the desert rainfall is (11·8 inches in the year at Umarkot, 18 at Nagar Parkar, but much less in the central portion of the desert, and especially towards Jaysalmír), it is evident that a long series of years must be required for ravines even a foot in depth to be cut in the sand, since it is only in exceptionally heavy showers that any water can run off so porous a surface. At the north-eastern termination of these sand-hills, however, there is frequently found a quantity of sand which is shewn to be newly deposited by its surface being ripple-marked, by the absence of holes made by burrowing animals, and by the stems of bushes being partially buried. Lastly, from the north-east corner of most of the high hills near Bálmir a long ridge of sand runs out, evidently deposited by the wind under the lee of the hill.

Now there is one point to which it is necessary to advert before going further. I must apologize for mentioning a fact doubtless familiar to most of my readers, but although familiar with it on a small scale, I did not clearly understand its application when I first went into the desert, and in consequence I was for some time greatly puzzled by the phenomena presented by the sand-hills; I think, too, that it has been overlooked by Sir Bartle Frere, and that this accounts in part for his doubting the efficacy of the wind in producing the sand-hills of the Thar. On the possibility that it may not be universally familiar I will venture to call attention to it.

When the wind blows over any surface composed of particles which can be moved independently, it forms waves or ridges more or less at right angles to its direction, with a long low slope to windward and a steeper slope to leeward. Something similar is seen in sand-banks formed by rivers and must be well-known to all who have navigated any Indian river in the dry season. In descending the stream the depth of water every here and there will be found to diminish gradually up to a certain point, which is part of a shoal stretching more or less across the channel; below this the water becomes suddenly deep. Here again the long gradual slope is on the side from which the current runs, the steep slope in the direction towards which the river is flowing.

This phenomenon on the small scale must be familiar to every one, as it may be seen on sand or dust wherever the wind blows over it. The long slope to windward is variable, the steeper slope to leeward is that assumed naturally by a talus of the material forming the ripples. The sand is driven up the longer windward slope by the wind and



falls over the crest of the ridge.\* Sand-dunes along the coast are rendered irregular in shape by accidents of the surface on which they have accumulated, but the laws of their formation are precisely similar to those of the ripples, and the same principles govern the formation of inland sand-hills. The latter are often even more irregular in form than the sand-dunes of the coast, because they are not formed along one general line, but depend on the accidental accumulation of sand wherever the character of the surface is favourable. In every case, however, the direction of the wind to which the drifting of the sand is due is marked by the two slopes in opposite directions, the long slope to windward, the steep slope to leeward. The sand-hills near Bálmir are evidently due to the transport of sand by a south-west wind.

I made many enquiries in the desert country as to the prevailing wind. From all whom I asked I received one answer, that during the hot season, May, June, and July, a strong wind blows steadily from the south-west. Even in March, on two occasions, a violent wind sprang up in the afternoon from that quarter, and the air was so thick with sand that at times it was impossible to see more than a dozen yards. There is no meteorological station fairly within the desert region, but the registers of wind-direction at Karáchi and Disá shew a great prevalence of south-westerly winds in the hotter months of the year, the general direction being more westerly at Disá than at Karáchi; up to April the general direction at Disá is north of west. At other periods of the year the winds are light, and during the months of January, February, and March, when I was in the desert, light breezes from the north or south prevailed alternately, but with the exception of the south-west winds already mentioned, they were quite insufficient to move the sands.

I do not think that further evidence is needed to prove that the formation of sand-hills throughout the eastern part of the desert is due to the south-west winds of the hot season, but there is a much greater difficulty as regards the long north-east to south-west ridges of the Thar. That they are also due to the prevailing winds is apparent from the circumstance (already mentioned) of their frequently terminating in a high bluff with a steep slope to the north-east, but still their general direction, identical with that of the prevailing wind, is rather difficult of explanation, because ridges

\* The formation of sand-dunes will be found discussed in any elementary treatise on Physical Geography or Geology. The following works contain excellent descriptions of the phenomena exhibited by blown sand:—Lyell, *Principles*, Vol. I, p. 516; De la Beche, *Geological Observer*, p. 69; Jukes, *Manual*, p. 154; Naumann, *Geognosie*, II, p. 1170; Ansted, *Physical Geography*, p. 467; and especially Marsh, '*Man and Nature*,' pp. 471-483, and Reclus, '*The Ocean*' (English translation), I, pp. 198-214. I am indebted to my brother Mr. H. F. Blanford for the latter references.



are usually produced at right angles to the wind's direction.\* Parallel rows of sand-dunes along a coast are frequently due to the regular sea-breeze, and, as may be seen on the east coast of India, there are often several such rows one behind the other, but they exhibit the usual evidence of their origin by having a long slope towards the sea and a short steep slope landwards. I think it quite possible that the sand-hills of Umarkot and Eastern Sind generally may be of such antiquity as to date from a period when the relative distribution of sea and land in the region was different from what it now is, and that to so great an extent as to completely modify the prevailing winds, and I have even been induced to speculate on the possibility of the existent parallel ridges of sand-hills marking successive coast-lines as the sea receded from the face of the country. This hypothesis, however, would render it necessary to suppose that the Indus valley was a land area whilst the present desert was part of the sea, and that the western coast-line of the sea with a general north-east to south-west direction gradually receded towards the south-east; or, *vice versâ*, that the Indus valley was sea, and the country to the south-east dry land. But I can hardly conceive that such gigantic changes as this would involve could have taken place without completely changing the original form of the sand-hills, and it is evident that the ridges in the region of the salt 'dhandhs' must be posterior in date to the time when their present site was part of an inlet of the sea, and not anterior to it. Moreover, had the sand-hills been formed along a coast-line, or even inland at right angles to the prevailing wind, they would, here and there at all events, have preserved some traces of their original slopes shewing the direction of the wind which produced them. But there is nothing of the kind to be found. I looked most carefully for some evidence of a steeper slope on one side than on the other, but without success, and I found double ridges having a trough-like hollow along the crest, with the slopes on both sides of the hollow, as well as those on both sides of the main ridge, equally steep. For such ridges I am quite unable to account by the effect of a wind blowing at right angles to their direction. If they were formed by one great sand-wave overtaking another, one side of the depression between the crests of the two waves must be much steeper than the other, and although this would be slightly modified by time, it could not be entirely obliterated and yet leave the general form of the waves so little altered as they now appear.

I am obliged therefore to reject the theory that these parallel ridges are due to a wind acting at right angles to their direction. I cannot accept Sir Bartle Frere's view that they are due to earthquake-action. The ridges

\* Naumann, however, in his 'Geognosie' (edition of 1854, Vol. 11, p. 1171), says—  
 "The sand-hills themselves are in every country extended in length in one direction which agrees with the direction of the prevailing wind."



consist of the characteristic blown sand ; the Allah Bund, to which Sir Bartle compares them, is only 20 feet high and of great breadth, and consists of the silt which forms the Ran\*, whilst even the fact of the elevation being due to the earthquake appears not clearly established. The only alternative conclusion as to the origin of the Thar sand-ridges is that they were due to the wind blowing in the same direction as that in which they lie. Sir B. Frere objects to their origin by the wind that they are higher than any known ridges of blown sand, but I find it recorded that in the Landes of Gascony many dunes exceed the elevation of 225 feet and one attains the height of 391 feet, whilst on the west coast of Africa hills of blown sand are said to be found in the neighbourhood of Cape Verde no less than 600 feet high.†

This view of the sand-ridges having been produced by winds blowing in the same direction is supported by the frequent occurrence (already mentioned) of abrupt terminations of the ridges at their north-eastern extremities. It should be borne in mind that the ridges, although extending for considerable distances, often for some miles, do end or coalesce every here and there, and that there is not any regularity in the size of the valleys that intervene ; some of these valleys being of considerable breadth, others narrow. As a rule, the intervening valleys do not exceed half a mile in breadth where the ridges are tolerably regular, and in many places the hollows are, as a rule, much narrower. Not unfrequently a tract is found where ridge and valley succeed each other with the greatest regularity for a few miles, the valleys being from twice to three times as broad as the ridges.

I am not able to explain the mode of formation of these parallel ridges satisfactorily to myself. I can suggest three modes in which they may have been formed, and I think it possible that all may have acted at times.

The first is the mode of formation from a ridge transverse to the direction of the wind. When such a ridge is driven forward, the ends advance more rapidly than the centre, and a crescent is formed, the convex side to windward. This on a small scale is a common and familiar phenomenon, and is mentioned and explained in all text-books. I can conceive it probable that, with constant supplies of sand, the ends of the crescent may continue to be produced until they form parallel ridges. But I must say I have not seen this change in progress in the sand-hills of the desert.

The second suggestion is that the sand is carried along in lines by the wind. I once came across a tract in which a sand-ridge appeared to be in process of formation. This was about 50 miles W. N. W. of Jaysalmir, at the spot where the Thar or sand-hill country was entered from the undula-

\* See Wynne, *Geology of Kutch*, *Memoirs Geological Survey of India*, IX, p. 40.

† Naumann, *Geognosie* ; Reclus, *L'Océan*, II. c. &c. The latter writer gives Ritter as his authority.



ting sandy plain. Over a breadth of about a quarter of a mile, and right and left, in the direction of the wind, as far as the eye could distinguish, the surface was covered with sand in small newly formed hillocks, mostly of crescentic form and about 5 to 10 feet high. The direction of the wind was shewn to be from S. 35 E., this being at right angles to the lines of ripples, and to the chords of the crescentic arcs formed by the hillocks; and the general direction of the sand-ridges immediately to the westward was the same. Many of these sand-ridges were so regular that it was difficult to conceive that they could have been formed otherwise than in long lines. But I do not quite understand how the wind can thus form them. There is a great difference between forming a line of hillocks and uniting them into one continuous ridge.

The third suggestion is that the tract of country along the edge of the Indus alluvium was originally covered at least as deep as the height of the present sand-hills by sand arranged more or less in ridges at right angles to the prevailing south-west wind, and that the valleys between the present sand-hills are the result of wind-denudation, their contents having been swept away and the intervening ridges left. The abrupt terminations of the ridges mark the former leeward slope of the sand-hills. On the whole, I think this last theory is the most probable of the three.

The sand, it is true, accumulates in long ridges behind any obstacle, and, when a ridge is once found, it will tend to be prolonged to leeward. But no obstacle exists of sufficient size to account for the commencement of a ridge 100 to 200 feet high.

§ 12. *Source of the Sand.*—There is yet one point which demands notice and that is the source of the sand. Rounded sand-grains are rarely produced in any quantity by simple subaërial disintegration, except in the case of the degradation of a sandstone, and in the present instance there is no sandstone area to windward. All the sand may safely be assumed to be derived from river-channels or the sea coast.

Part of the sand may be derived from the bed of the Indus, and probably a large portion of the sand-hills of Rohri are supplied from this source. But it is difficult to conceive that all the sand-hills of Thar and Párkár, Malláni, Jaysalmír, &c., can have derived their sand from the Indus, to say nothing of those of Jodhpúr, Bikanír, &c.

Some of the sand also may be derived from the present coast-line. But all the sand-hills are at a distance from the coast, and it is difficult to conceive that all the sand has been blown across the delta of the Indus and the Ran of Kachh to reach the region where it so greatly abounds. Had all the sand which is spread over the plains of western Rájputána been blown across the Ran, the latter would surely have been converted into a sandy desert long since.



The only remaining conclusion is that the sands are derived from a former coast-line, which no longer exists. The greatest accumulations of sand are found in the lowest portions of the desert, along the edge of the Indus alluvium, and in the basin of the Lúni, and it has already been pointed out that, precisely in these localities, the presence of salt in considerable quantities renders the inference probable that arms of the sea extended into them at a comparatively recent date. Thus both the distribution of salt and the prevalence of sand-hills point to the same conclusions, and it is reasonable to infer that the sea, which, at no remote period, covered the Ran of Kachh, extended for a considerable distance both to the north up the Indus valley and to the north-east up the basin of the Lúni.

In most countries in which sand is blown from river-beds or the sea-coast, it is either blown into other river-channels or it is swept into them by rain. Once in the river-channels it is again carried onward to the sea. There are small sand-hills in abundance in the Indus alluvial plain, but they attain no great size because the sand is always swept sooner or later into some stream. The peculiarity of the desert is the absence of any streams—a want due primarily to the small rainfall, but intensified of course by the accumulation of sand and the consequently porous nature of the soil. To the eastward in Rájputána, as the rainfall increases, streams become more numerous and sand-hills diminish in number. In short, the sands of the Indian desert appear to have been blown from an old coast-line in the Indus valley, along the northern edge of the Ran of Kachh, and probably in the Lúni valley, by the strong south-west wind, and they remain spread over the country for the want of streams to carry them back to the sea.

§ 13. *Conclusions.*—The conclusions to which I have been led by the facts narrated in the previous paper may be thus briefly recapitulated.

1. Within very recent geological times the Ran of Kachh was part of an inlet of the sea, which certainly extended for a considerable distance up the eastern edge of the area now occupied by the Indus alluvium, and perhaps occupied the whole alluvial area of the Indus valley: it also in all probability covered a considerable tract in the Lúni basin.

2. The central portion of the desert about Jaysalmír and Bálmír was not covered by the sea, but formed either an island or a promontory. As the northern part of the desert, towards Baháwalpúr and Bikanír, has not been examined, it is uncertain whether there is any evidence of its having been covered by the sea or not.

3. The sand of the desert is mainly derived from the old sea-coast, and its transport into the interior of the country is due to the south-west wind.





the N. W. Provinces, the rainfall of this year was deficient. I may here point to a parallelism between this case and that of the rainfall in cyclones, in which it appears, by the common consent of observers, that the greatest rainfall occurs in advance of the cyclone-centre.

Now something similar to the above relation seems to be traceable in other cases when the depression is less intense and the effect more extensive. In 1873, although the fall was deficient in Bengal and the N. W. Provinces, it was not so in the Punjab nor about Roorkee and Agra, which lay to the west or north-west of the abnormal depression in Oude; that is to say, beyond the depression, in the course followed by the vapour-bearing winds. It was very copious also in Burmah, which lay beyond (to the north and north-east of) the Nicobar depression, the monsoon-current here being from the south-west. In 1871, when there was an abnormal depression in the east of the Bay, in Orissa, and about Jubbulpore; (how far this last may have extended east and west we do not know, in the absence of stations); the rainfall was abundant in the Gangetic valley and Bengal, as well as the Central Provinces. But on the other hand, we must not lose sight of the fact, that in 1872 and 1873, when the depression was as great or greater in the Bay of Bengal and Orissa, the rainfall in Bengal as in Northern India generally was light or very deficient. This fact warns us that we must not push too far the conclusions drawn from our present imperfect data.

The mean or normal values adopted as standards in the following tables are those of all registers up to the end of 1874. The number of years in each case is from 5 to 8. The table of these values is given at page 15 of the Meteorological Report for Bengal for the year 1874.

1868. *Table of total barometric Anomalies.*

|                  | Calcutta. | Sagar Id. | False Pt. | Cuttack. | Chitta-gong. | Akyab. |
|------------------|-----------|-----------|-----------|----------|--------------|--------|
| January, .....   | + ·024    | + ·016    | — ·036    | — ·013   | — ·004       | — ·032 |
| February, .....  | + ·011    | — ·039    | — ·043    | — ·001   | — ·011       | — ·007 |
| March, .....     | + ·026    | — ·010    | — ·035    | + ·004   | — ·009       | — ·001 |
| April, .....     | + ·008    | — ·032    | — ·059    | — ·011   | — ·025       | + ·018 |
| May, .....       | + ·102    | + ·054    | 0         | + ·063   | + ·045       | + ·072 |
| June, .....      | 0         | — ·043    | — ·044    | — ·002   | — ·035       | + ·047 |
| July, .....      | + ·035    | — ·020    | — ·044    | + ·004   | — ·001       | + ·049 |
| August, .....    | — ·020    | — ·128    | — ·085    | — ·088   | — ·067       | — ·013 |
| September, ..... | 0         | — ·072    | — ·072    | — ·004   | — ·016       | + ·011 |
| October, .....   | + ·034    | — ·021    | — ·013    | + ·046   | + ·016       | + ·009 |
| November, .....  | — ·014    | — ·049    | — ·059    | — ·010   | — ·034       | — ·068 |
| December, .....  | + ·027    | + ·012    | — ·021    | + ·020   | + ·004       | + ·002 |



1868. *Table of relative barometric Anomalies.*

|                  | Sagar Id.<br>to Cal-<br>cutta. | False Pt.<br>to Cal-<br>cutta. | Cuttack<br>to Cal-<br>cutta. | False Pt.<br>to Cut-<br>tack. | False Pt.<br>to<br>Akyab. | Akyab to<br>Chitta-<br>gong. |
|------------------|--------------------------------|--------------------------------|------------------------------|-------------------------------|---------------------------|------------------------------|
| January, .....   | — ·008                         | — ·060                         | — ·037                       | — ·023                        | — ·004                    | — ·028                       |
| February, .....  | — ·050                         | — ·054                         | — ·012                       | — ·042                        | — ·036                    | + ·004                       |
| March, .....     | — ·036                         | — ·061                         | — ·022                       | — ·039                        | — ·034                    | + ·008                       |
| April, .....     | — ·040                         | — ·067                         | — ·019                       | — ·048                        | — ·077                    | + ·043                       |
| May, .....       | — ·048                         | — ·102                         | — ·039                       | — ·063                        | — ·072                    | + ·027                       |
| June, .....      | — ·043                         | — ·044                         | — ·002                       | — ·042                        | — ·091                    | + ·082                       |
| July, .....      | — ·055                         | — ·079                         | — ·031                       | — ·048                        | — ·093                    | + ·050                       |
| August, .....    | — ·108                         | — ·065                         | — ·068                       | + ·003                        | — ·072                    | + ·054                       |
| September, ..... | — ·072                         | — ·072                         | — ·004                       | — ·068                        | — ·083                    | + ·027                       |
| October, .....   | — ·055                         | — ·047                         | + ·012                       | — ·033                        | — ·022                    | — ·007                       |
| November, .....  | — ·035                         | — ·045                         | + ·004                       | — ·049                        | + ·009                    | — ·034                       |
| December, .....  | — ·015                         | — ·048                         | — ·007                       | — ·041                        | — ·023                    | — ·002                       |

1869. *Table of total barometric Anomalies.*

|                  | Port<br>Blair. | Akyab. | Chitta-<br>gong. | Madras. | False Pt. |
|------------------|----------------|--------|------------------|---------|-----------|
| January, .....   | + ·101         | + ·053 | + ·037           | + ·038  | + ·060    |
| February, .....  | + ·048         | ?      | + ·001           | + ·007  | + ·040    |
| March, .....     | + ·020         | + ·010 | — ·020           | — ·006  | + ·052    |
| April, .....     | + ·021         | + ·008 | — ·026           | — ·005  | + ·040    |
| May, .....       | + ·021         | + ·014 | — ·015           | — ·010  | + ·042    |
| June, .....      | — ·011         | — ·039 | — ·054           | — ·034  | — ·003    |
| July, .....      | + ·002         | + ·004 | — ·020           | — ·019  | + ·019    |
| August, .....    | + ·010         | + ·041 | + ·033           | — ·013  | + ·058    |
| September, ..... | + ·006         | + ·029 | — ·020           | — ·008  | + ·021    |
| October, .....   | — ·003         | + ·006 | — ·037           | — ·012  | + ·014    |
| November, .....  | + ·015         | + ·025 | + ·012           | — ·009  | + ·048    |
| December, .....  | + ·004         | ?      | — ·034           | — ·056  | + ·008    |

|                  | Cuttack. | Berham-<br>pore. | Mon-<br>ghyr. | Nagpore. | Jubbul-<br>pore. |
|------------------|----------|------------------|---------------|----------|------------------|
| January, .....   | + ·052   | + ·056           | + ·039        | — ·001   | + ·046           |
| February, .....  | + ·038   | + ·016           | + ·001        | — ·045   | + ·008           |
| March, .....     | + ·039   | — ·018           | + ·013        | — ·049   | — ·020           |
| April, .....     | + ·021   | — ·050           | ?             | — ·034   | — ·007           |
| May, .....       | + ·019   | — ·005           | ?             | — ·049   | — ·025           |
| June, .....      | — ·041   | — ·151           | — ·030        | — ·049   | — ·002           |
| July, .....      | + ·015   | — ·058           | + ·006        | — ·019   | + ·011           |
| August, .....    | + ·055   | + ·038           | + ·014        | — ·010   | + ·046           |
| September, ..... | — ·005   | — ·008           | — ·022        | — ·052   | — ·036           |
| October, .....   | + ·006   | — ·011           | + ·004        | — ·036   | — ·058           |
| November, .....  | + ·037   | + ·011           | + ·034        | + ·018   | — ·017           |
| December, .....  | + ·025   | — ·046           | — ·016        | — ·046   | — ·032           |





1876.]

*Barometric Anomalies.*

39

1869. *Table of relative barometric Anomalies.*

|                  | Akyab to<br>Port<br>Blair. | Akyab to<br>Chitta-<br>gong. | False Pt.<br>to Mad-<br>ras. | False Pt.<br>to Cut-<br>tack. | False Pt.<br>to Ber-<br>hampore. | Cuttack<br>to<br>Jubbul-<br>pore. |
|------------------|----------------------------|------------------------------|------------------------------|-------------------------------|----------------------------------|-----------------------------------|
| January, .....   | — ·048                     | + ·016                       | + ·022                       | + ·008                        | + ·004                           | + ·006                            |
| February, .....  | ?                          | ?                            | + ·033                       | + ·002                        | + ·024                           | + ·030                            |
| March, .....     | — ·010                     | + ·030                       | + ·058                       | + ·013                        | + ·070                           | + ·059                            |
| April, .....     | — ·013                     | + ·034                       | + ·045                       | + ·019                        | + ·090                           | + ·028                            |
| May, .....       | — ·007                     | + ·029                       | + ·052                       | + ·023                        | + ·047                           | + ·044                            |
| June, .....      | — ·028                     | + ·015                       | + ·031                       | + ·038                        | + ·148                           | — ·039                            |
| July, .....      | + ·002                     | + ·024                       | + ·038                       | + ·004                        | + ·077                           | + ·004                            |
| August, .....    | + ·031                     | + ·008                       | + ·045                       | + ·003                        | + ·020                           | + ·009                            |
| September, ..... | + ·023                     | + ·049                       | + ·013                       | + ·026                        | + ·029                           | + ·031                            |
| October, .....   | + ·009                     | + ·043                       | + ·026                       | + ·008                        | + ·025                           | + ·064                            |
| November, .....  | + ·010                     | + ·013                       | + ·057                       | + ·011                        | + ·037                           | + ·054                            |
| December, .....  | ?                          | ?                            | + ·064                       | — ·017                        | + ·054                           | + ·057                            |

|                  | Cuttack<br>to Mon-<br>ghyr. | Jubbul-<br>pore to<br>Nagpore. | Berham-<br>pore to<br>Mon-<br>ghyr. | Berham-<br>pore to<br>Chitta-<br>gong. | False Pt.<br>to<br>Akyab. |
|------------------|-----------------------------|--------------------------------|-------------------------------------|----------------------------------------|---------------------------|
| January, .....   | + ·013                      | + ·047                         | + ·017                              | + ·019                                 | + ·007                    |
| February, .....  | + ·037                      | + ·053                         | + ·015                              | + ·015                                 | ?                         |
| March, .....     | + ·026                      | + ·029                         | — ·031                              | + ·002                                 | + ·042                    |
| April, .....     | ?                           | + ·027                         | ?                                   | — ·024                                 | + ·032                    |
| May, .....       | ?                           | + ·024                         | ?                                   | + ·010                                 | + ·028                    |
| June, .....      | — ·011                      | + ·047                         | — ·121                              | — ·097                                 | + ·036                    |
| July, .....      | + ·009                      | + ·030                         | — ·064                              | — ·038                                 | + ·015                    |
| August, .....    | + ·041                      | + ·056                         | + ·024                              | + ·005                                 | + ·017                    |
| September, ..... | + ·017                      | + ·016                         | + ·014                              | + ·012                                 | — ·008                    |
| October, .....   | + ·002                      | — ·022                         | — ·015                              | + ·036                                 | + ·008                    |
| November, .....  | + ·003                      | — ·035                         | — ·023                              | — ·001                                 | + ·023                    |
| December, .....  | + ·041                      | + ·014                         | — ·030                              | — ·012                                 | ?                         |

1870. *Table of total barometric Anomalies.*

|                  | Port<br>Blair. | Akyab. | Chitta-<br>gong. | Madras. | Vizaga-<br>patam. | False Pt. |
|------------------|----------------|--------|------------------|---------|-------------------|-----------|
| January, .....   | — ·159         | ?      | — ·072           | — ·083  | — ·098            | — ·010    |
| February, .....  | — ·042         | — ·015 | — ·042           | — ·034  | — ·052            | + ·029    |
| March, .....     | — ·032         | — ·017 | — ·050           | — ·022  | — ·021            | + ·017    |
| April, .....     | — ·024         | — ·014 | — ·038           | — ·031  | — ·007            | + ·019    |
| May, .....       | — ·032         | — ·041 | — ·014           | — ·057  | — ·045            | — ·044    |
| June, .....      | — ·004         | + ·064 | + ·063           | + ·005  | + ·037            | + ·068    |
| July, .....      | — ·023         | + ·007 | — ·020           | — ·008  | — ·019            | — ·007    |
| August, .....    | — ·037         | — ·021 | — ·023           | — ·007  | — ·009            | + ·008    |
| September, ..... | — ·019         | + ·026 | + ·014           | + ·001  | — ·007            | + ·036    |
| October, .....   | — ·006         | + ·028 | — ·004           | + ·007  | + ·004            | + ·028    |
| November, .....  | — ·012         | + ·005 | — ·028           | + ·008  | — ·017            | + ·001    |
| December, .....  | — ·069         | + ·002 | — ·009           | + ·020  | + ·013            | + ·036    |



1870. *Table of total barometric Anomalies.*

|                  | Cuttack. | Berham-<br>pore. | Mon-<br>ghyr. | Jubbul-<br>pore. | Nagpore. |
|------------------|----------|------------------|---------------|------------------|----------|
| January, .....   | — ·033   | — ·063           | — ·028        | — ·085           | — ·055   |
| February, .....  | + ·015   | — ·034           | — ·004        | + ·008           | + ·001   |
| March, .....     | + ·019   | — ·027           | — ·003        | + ·039           | + ·004   |
| April, .....     | + ·020   | + ·003           | + ·017        | + ·009           | — ·023   |
| May, .....       | — ·052   | — ·065           | — ·066        | + ·013           | — ·027   |
| June, .....      | + ·038   | + ·064           | + ·024        | + ·036           | + ·037   |
| July, .....      | — ·021   | — ·028           | — ·032        | + ·007           | — ·015   |
| August, .....    | + ·016   | — ·019           | — ·003        | — ·037           | + ·006   |
| September, ..... | + ·022   | — ·001           | + ·001        | + ·005           | + ·024   |
| October, .....   | + ·006   | — ·011           | — ·015        | — ·034           | — ·003   |
| November, .....  | — ·013   | — ·018           | — ·024        | — ·034           | + ·010   |
| December, .....  | — ·060   | — ·007           | — ·006        | — ·003           | + ·072   |

1870. *Table of total barometric Anomalies.*

|                  | Akyab to<br>Port<br>Blair. | Akyab to<br>Chitta-<br>gong. | Vizaga-<br>patam to<br>Madras. | False Pt.<br>to Viza-<br>gapatam. | False Pt.<br>to Cut-<br>tack. | False Pt.<br>to Ber-<br>hampore. |
|------------------|----------------------------|------------------------------|--------------------------------|-----------------------------------|-------------------------------|----------------------------------|
| January, .....   | ?                          | ?                            | — ·015                         | + ·088                            | + ·023                        | + ·053                           |
| February, .....  | + ·027                     | + ·027                       | — ·018                         | + ·081                            | + ·014                        | + ·063                           |
| March, .....     | + ·015                     | + ·033                       | + ·001                         | + ·038                            | — ·002                        | + ·044                           |
| April, .....     | + ·010                     | + ·024                       | 0                              | + ·034                            | — ·001                        | + ·016                           |
| May, .....       | — ·009                     | — ·027                       | + ·012                         | + ·001                            | + ·008                        | + ·021                           |
| June, .....      | + ·068                     | + ·001                       | + ·032                         | + ·031                            | + ·030                        | + ·004                           |
| July, .....      | + ·030                     | + ·027                       | — ·011                         | + ·011                            | + ·014                        | + ·021                           |
| August, .....    | + ·016                     | + ·002                       | — ·002                         | + ·017                            | — ·008                        | + ·027                           |
| September, ..... | + ·045                     | + ·012                       | — ·008                         | + ·043                            | + ·014                        | + ·037                           |
| October, .....   | + ·034                     | + ·012                       | — ·003                         | + ·024                            | + ·022                        | + ·039                           |
| November, .....  | + ·017                     | + ·033                       | — ·025                         | + ·018                            | + ·014                        | + ·019                           |
| December, .....  | + ·071                     | + ·011                       | — ·007                         | + ·023                            | + ·096                        | + ·043                           |

|                  | Cuttack<br>to Jub-<br>bulpore. | Cuttack<br>to Mon-<br>ghyr. | Berham-<br>pore to<br>Mon-<br>ghyr. | Berham-<br>pore to<br>Chitta-<br>gong. | Jubbul-<br>pore to<br>Nagpore. | False Pt.<br>to<br>Akyab. |
|------------------|--------------------------------|-----------------------------|-------------------------------------|----------------------------------------|--------------------------------|---------------------------|
| January, .....   | + ·052                         | — ·005                      | — ·035                              | + ·009                                 | — ·030                         | ?                         |
| February, .....  | + ·007                         | + ·019                      | — ·030                              | + ·008                                 | + ·007                         | + ·044                    |
| March, .....     | — ·020                         | + ·022                      | — ·024                              | + ·023                                 | + ·035                         | + ·034                    |
| April, .....     | + ·011                         | + ·003                      | — ·014                              | + ·035                                 | + ·032                         | + ·033                    |
| May, .....       | — ·065                         | + ·014                      | + ·001                              | — ·051                                 | + ·040                         | — ·003                    |
| June, .....      | + ·002                         | + ·014                      | + ·040                              | + ·001                                 | — ·001                         | + ·004                    |
| July, .....      | — ·028                         | + ·011                      | + ·004                              | — ·008                                 | + ·023                         | — ·014                    |
| August, .....    | + ·053                         | + ·019                      | — ·016                              | + ·004                                 | — ·043                         | + ·029                    |
| September, ..... | + ·017                         | + ·021                      | — ·002                              | — ·015                                 | — ·019                         | + ·010                    |
| October, .....   | + ·040                         | + ·021                      | + ·004                              | — ·007                                 | — ·031                         | 0                         |
| November, .....  | + ·021                         | + ·011                      | + ·006                              | + ·010                                 | — ·044                         | — ·004                    |
| December, .....  | — ·063                         | — ·054                      | — ·001                              | + ·002                                 | — ·075                         | + ·034                    |





SUTHORA DAFLAENSIS.





J. S. Aust. del. et lit.

ACTINURA DAFLAENSIS

M. A. N. Hammett. imp.





# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

---

### Part II.—PHYSICAL SCIENCE.

---

No. III.—1876.

---

X.—*A Sketch of the Vegetation of the Nicobar Islands.*  
By S. KURZ.

(Received July 27th ;—Read August 2nd, 1876.)

(With Plates XII and XIII.)

The Nicobars form a link in the chain of islands that stretches up from Sumatra to the Arracan Yomah, and they are in all probability the remnants of a mountain-range that connected Sumatra (and more especially the Nias islands, where the same sandstone prevails as that of the Andamans and Arracan) and Arracan at a time when the sea covered the vast alluvial plains of the Ganges and the Indus, thus rendering Hindustan an island subsequently to its probable connection with Africa.

Geologically, the Nicobars are divisible into two groups, the southern and the northern. The former comprises Great and Little Nicobar with the adjacent islets and Katchall. It is characterised by the predominance of calcareous sandstones (Brown-coal formation). The northern group includes Nankowry, Kamorta, Trinkut,\* Teressa, Tillangchong, Karnicobar, and the small islands near them. Alluvial deposits and plutonic rocks are the conspicuous feature here. This geological division admirably coincides with the general botanical appearance of the respective islands.† While the islands of the southern

\* Trinkut is not entirely composed of raised coral-reefs as Dr. Hochstetter has stated, but has grass-heaths in the centre, the presence of polycistina-clay being thus indicated. It is a very flat island, barely 50 feet. above sea-level in the interior.

† This sketch relates to the islands of Katchall and Kamorta only, sickness having prevented me from extending my explorations to the other islands. A review of the more interesting peculiarities of the Nicobar vegetation is to be found in Trimen's Journal of Botany, 1875, p. 321 sqq.



group are forest-clad from the bottom to the top, the forests on the northern group are restricted to the plutonic rocks and to the slopes and dells of the older alluvium, while the hilly plateaux and ridges are covered with park-like grass-heaths.

Botanically, we have to consider the following rocks and soils as influential:—

1. Plutonic and metamorphic rocks, which crop out only in a few localities and are very subordinate.
2. Calcareous sandstones, which cover by far the greater part of the southern group.
3. Raised coral-reefs much broken up and intermingled with calcareous sand and vegetable mould.
4. Calcareous sea-sand, or blown sand, consisting of minute rounded fragments of shells and corals.
5. Polycistina-clay, which covers the greater part of the area on the northern group. It is very light and siliceous, and remarkable for the absence of alkalies. Locally it is ferruginous and of a red colour, and in this case usually accompanied by fossil sea-weeds.
6. Marine silty clay at the debouchures of rivers, more especially in sheltered bays and shoals.

Dr. Rink and Dr. Hochstetter have already been struck by the close coincidence of the vegetation with the underlying rocks on these islands; and although a close examination of this relation revealed to me many important exceptions, we must be guided in all phytogeographical matters not only by the consideration of climatic influence but as much also by that of the influence of soil.

As the climate is a tropical moist one, identical with that of most Malay islands, and the elevation of the hills too small to affect vegetation, the influence of the soil naturally becomes more conspicuous and marked. Owing to the uniformly damp climate deciduous forests have ceased at this latitude, although deciduous trees are not unfrequently interspersed, especially in sunny localities. Evergreen trees thus form the bulk of the forests, and even the beach-forests, sunny forests growing on calcareous sand, are studded with evergreens, so that the deciduous trees become quite subordinate. I have distinguished the following kinds of vegetative combinations on these islands:—1. MANGROVE FORESTS. 2. BEACH FORESTS. 3. TROPICAL FORESTS. 4. GRASS-HEATHS. 5. MARINE VEGETATION.

Cultivation is little represented, being restricted to small patches of cleared land usually at some distance inland from the villages.

#### 1. MANGROVE FORESTS.

The mangrove-forests of all tropical Asia are so uniform, not only in external aspect but also in their botanical character, that it is hardly



necessary to enumerate their constituents. They occupy, as already indicated, chiefly the silty debouchures of the rivers, and are most fully developed in the quiet bays, and more especially along the channel that separates Kamorta from Nankowry. *Rhizophora mucronata* and *Bruguiera mucronata* form usually the bulk of these forests on the Nicobars. Owing to the smallness of the rivers, and to the consequent narrowness of river-alluvium, the variety of these forests distinguished by me as 'tidal forests' is not developed, although localities are met with, on the banks raised above tidal mark, which partake of the same character.

## 2. BEACH FORESTS.

The beach-forests, or dune-forests, as Dr. Junghuhn, in his excellent account of the vegetation of Java, has more appropriately called them, are restricted to the beaches of fine calcareous sand which stretch along the shores where the hills do not interfere. The islands being in a rising condition, the formation of beaches is favoured to a greater degree than at the Andamans and elsewhere, and some of them extend as far as half a mile inwards. They necessarily form narrow, often crescent-shaped strips, and abruptly terminate where the raised coral-reefs commence. The trees here stand apart and are light-loving ones, and of these the cocoa-nut-palm forms the principal constituent, no doubt much encouraged in its dense growth by cultivation. The outskirts of these dunes are usually marked by a few long-creeping plants, such as *Ipomoea pes-caprae*, *Vigna lutea*, *Ischaemum muticum*, *Thouarea sarmentosa* locally on Katchall, *Ipomoea littoralis*, etc. To these succeed a number of small trees or shrubs, which appear from the sea like a dense hedge; these are chiefly the glaucous-looking *Scaevola Koenigii*, *Pandanus odoratissimus*, *Tournefortia argentea* (especially on the southern group), *Paritium tiliaceum*, *Sophora tomentosa* locally, *Crinum Asiaticum* with a plantain-like trunk up to 3 feet high by nearly a foot in thickness, and others. Then follow *Calophyllum inophyllum*, *Hernandia peltata*, *Glochidion calocarpum*, *Eugenia Javanica*, *Sterculia mollis*, *Premna integrifolia*, *Erythrina Indica*, *Pongamia glabra*, *Desmodium umbellatum*, *Macaranga Tanarius*, *Heritiera littoralis*, *Cynometra bijuga*, *Ficus retusa*, *Thespesia populnea*, *Peltophorum ferrugineum* scantily, *Cycas Rumphii*, *Vitex negundo*, *Atalantia macrophylla*, *Claoxylon molle* and *C. longifolium*, *Azalia bijuga*, *Barringtonia speciosa*, *Odina wodier*, *Ficus hispida*, *Terminalia catappa*, *Guettarda speciosa*, *Dracaena linearifolia* in abundance, *Excoecaria Agallocha*, *Semecarpus heterophyllus*, *Barringtonia racemosa*, *Ochrosia salubris*, *Cerbera Odallam*, *Briedelia glauca*, and others. The shrubby vegetation consists chiefly of *Morinda bracteata*, *Callicarpa longifolia*, *Cordia subcordata*, *Breynia racemosa*, *Securinega obovata*, *Allophylus Cobbe*, *Tabernaemontana Nicobarica*, *Leea sambucina* and, locally,



*L. grandifolia*, *Pluchea Indica*, *Olerodendrum inerme*, intermingled with a young growth of trees and climbers, such as *Cyclea peltata*, *Canavalia virosa*, *Caesalpinia nuga* and *C. Bonduc*, *Wedelia scandens*, *Ipomoea Turpethum*, *Entada scandens*, *Anodendron*, *Ipomoea campanulata*, here and there a rattan, *Colubrina Asiatica*, *Derris scandens* and *D. uliginosa*, several species of *Vitis*, *Flagellaria Indica*, *Stenochlaena scandens*, *Modecca Nicobarica*, etc. On the ground chiefly grow *Ischaemum muticum* in abundance, *Centotheca lappacea*, *Oplismenus compositus*, *Remirea maritima* locally, *Euphorbia atoto*, *Aerva lanata*, *Eranthemum succifolium* very commonly, *Ophiorrhiza mungos* chiefly from the base of the cocoa-nut-palm, *Kyllingia monocephala*, the white-spiked variety of *Cyperus umbellatus*, and a number of widely distributed weeds. *Cassytha filiformis* often quite covers the shrubbery, while the trunks of the trees are seen to be clothed with *Dischidia Bengalensis* or *D. nummularia*, *Pothos scandens*, or with some *Hoya*. Orchids are here numerous on the branches of the higher trees, *Dendrobium crumenatum* and *Luisia* particularly so. The stems of the trees are covered with lichens, especially those of the cocoa-nut-palms, which are literally clothed by them and by a few acrocarpous mosses (chiefly *Octoblepharum*, *Macromitrium*), while a few ferns (amongst them *Davallia parallela* and *D. heterophylla*, *Polypodium phymatodes*, *P. quercifolium*, and *P. adnascens*) also find a favourable station between the rugged scars of this same palm.

As these dunes are the principal seat of the villages, there spring up, around the huts of the natives and often far away from them, a number of trees, shrubs, and weeds, which are with difficulty distinguished from the surrounding indigenous vegetation. Most of them can hardly be said to have been planted but rather to have sprung up of themselves. Such are *Citrus Hystrix* and *C. nobilis*, *Bixa Orellana*, *Carica papaya*, *Ricinus communis*, *Psidium guava*, *Triphasia trifoliolata*, *Capsicum frutescens*, *Solanum melongena*, *Lagenaria vulgaris*, etc.; also such weeds as *Ageratum conyzoides*, *Vernonia cinerea*, *Digitaria*, *Eragrostis*, *Solanum nigrum*, *Datura*, *Amarantus viridis*; and sometimes *A. Gangeticus*, *Sida acuta*, *Urena lobata*, *Scoparia dulcis*, *Cassia occidentalis*, *Blumea lacera*, *Ocimum sanctum*, *Euphorbia pilulifera*, *Paspalum conjugatum*, *Eleusine Indica*, *Gynandropsis pentaphylla*, etc., etc.

### 3. TROPICAL FORESTS.

The tropical forests occupy a large (say, about one-third of the whole) area of the islands of the northern group, while they are so greatly developed in the southern group as to leave only a small fraction for the other forests (mangrove- and beach-forests). I am obliged to divide them into two groups, namely, (i). *Coral-reef Forests*, and (ii). *True Tropical Forests*, growing on elevated ground.



(i). *Coral-reef Forests.*—These forests occupy, as the name indicates, the raised coral-reefs which usually stretch out behind the dunes, and are sometimes of comparatively large extent. The substratum being calcareous and of a very permeable nature, these differ greatly in their constituents from the true tropical forests. They form masses of pretty low evergreen trees overshadowed only by a few species of lofty trees up to 120 feet high, which, however, are pretty numerous in individuals. Such big trees are *Eugenia occlusa*, *Alstonia spectabilis*, *Ficus Indica* and *F. retusa*, *Artocarpus pomiformis*, *Saccopetalum Horsfieldii*, *Garcinia speciosa*, and a few others not recognised by me. The smaller trees comprise chiefly *Orophea Katschallica* in abundance, *Glycosmis insularis*, *Aglaia argentea* and *A. Andamanica*, *Amoora ganggo*, *Cupania Jackiana*, *Olax imbricata*, *Apodytes Andamanica*, *Ixora Pavetta*, *I. weberæfolia* in abundance, and *I. brunnescens*, *Webera densiflora*, *Petunga Roxburghii*, *Morinda bracteata*, *Alchornea*, *Alsophila albo-setacea* here and there (usually clothed with mosses and *Trichomanes Filicula* and *T. muscoides*), *Mallotus acuminatus* and *M. muricatus* in abundance, and several others. Of the shrubs are especially conspicuous *Psychotria Nicobarica*, *P. tylophora*, and *P. Andamanica*, *Ixora Kurziana*. *Areca Catechu* is here so plentiful as to appear wild, but is, I believe, only planted or self-sown. *Pandanus Leram* usually accompanies the betel-nut palm. Of climbers, I observed chiefly *Griffithia curvata*, *Dinochloa Andamanica*, *Antitaxis calocarpa*, *Vitis lanceolaria* and other species, *Alangium Sundanum*, *Stenochlæna scandens*, *Freycinetia* in abundance, often accompanied by the fleshy *Pellionia procrdifolia*. The soil-cover is scanty and chiefly consists of *Adenostema viscosum*, *Aglaonema simplex*, *Cyperus moestus*; and a number of ferns, such as *Davallia speluncae*, *Vittaria elongata*, *Antrophium callæfolium*, *Asplenium macrophyllum*, and *Nephrolepis acuta* are observed as epiphytes, together with a number of orchids, especially *Saccolabium obliquum*. The coral-rocks are densely covered with a tamariscine *Hypnum*, and long garlands of *Neckera Lepineana* and of *Hepaticae* depend from the branches and trunks where the jungle is not too dark.

Where depressions occur in these upheaved coral-lands, fresh water collects and forms pools and swamps,\* which dry up more or less during the driest months on these islands (March and April). These are filled then to several feet in depth with black vegetable mould, which is so soft that one sinks into it up to the knees. They cause a sort of swamp-forest

\* Dr. Rink has proposed a theory to explain the origin of these swamps in the raised coral-reefs. Similar jungle-swamps, often of large extent, occur in all Malay tropical forests on metamorphic as well as on alluvial formations, and are in my opinion only the result of rains, which drain into the depressions and carry quantities of vegetable mould into them until they silt up.



represented by *Ficus Indica* and *F. retusa*, the plank-like compressed roots of which often extend far into it and afford the only firm footing; while on other islands *Pandanus Leram* takes possession of them. Little else grows on this black marshy ground except here and there a *Polygonum* or a *Helminthostachys*. *Lemna paucicostata* is often frequent here, and a *Najas* too was observed. These jungle-swamps are the natural reservoirs of drinking water for the Nicobarese, who simply dig a hole into the mould, wherein the water collects.

(ii). *True Tropical Forests*.—These forests grow on different substrata, and those growing on the calcareous sandstone of Katchall and of the other islands of the southern group will have to be distinguished from those which grow on polycistina-clay and on plutonic rocks. Having, however, for several reasons been prevented from exploring these forests on Katchall, I can only testify to the truth of Dr. Rink's statement that those of them which grow on the shady side of the ridges are, like those that grow on plutonic rocks, the loftiest forests on the islands and hence most difficult to explore; the south-west exposures, however, of these ridges on Katchall are covered by a stunted forest wherein the trees are not crowded, and which, to judge from the colour of rounded crowns, must be very poor in species.

The Andamanese bullet-wood tree (*Mimusops littoralis*) is frequent along the coast of Katchall, and I met with fallen trunks of it which measured 80 feet clear stem by 10 to 12 ft. in girth.

I will, therefore, restrict my remarks solely to the tropical forests as they are represented on the polycistina-clay of Kamorta. This island is formed chiefly of this clay, while only the extreme S. W. part (hills about 1,000 feet high) consists of plutonic rocks. The forests, however, do not cover the whole of this formation, but abruptly terminate just below the top of the hilly plateaux, although two broad strips of tropical forest cross the whole island. The trees at the upper limit rather suddenly become stunted, as if unfavourable exposure had checked their growth and given them the appearance of having reached the limit of tree-growth. The cause of the abrupt demarcation of these tropical forests and the grass-heaths on the very same substratum remains a mystery to me. Above all the trees, however high, a palm towers majestically, and in such quantity as to form, as it were, a palm-forest above the other trees. This is *Areca augusta*. The lofty or large trees (many of which, however, become quite stunted at the outskirts of the forest bordering the grass-heaths) are chiefly the following:—*Artocarpus peduncularis* and *A. pomiformis*, *Radermachera Lobbiai*, *Eugenia occlusa*, *Sterculia campanulata*, *Symplocos leiostachya*, *Ternstroemia macrocarpa*, *Trichospermum Javanicum*, *Garcinia cornea*, *Orania Nicobarica* in abundance, *Ficus Indica*, *F. chrysocarpa*, and *F. retusa*, *Gonystylus Miquelianus*, *Sapindus montanus*, *Terminalia* sp. near



*T. catappa*, *Dillenia pilosa*, *Calophyllum spectabile*, *Elæocarpus*, *Albizzia stipulata* plentifully, *Gardenia resinifera*, *Nauclea excelsa*, *Alstonia macrophylla*, *Cryptocarya ferrea*, *Litsaea foliosa*. Amongst the smaller trees the following are conspicuous :—*Arthrophyllum Blumeianum*, *Ixora weberaeifolia*, *Polyphragmon flavescens*, *Maesa ramentacea*, *Cinnamomum obtusifolium*, *Barringtonia racemosa*, *Sideroxylon attenuatum*, *Eagraea racemosa*, *Myristica corticosa*, *Antidesma puncticulatum* and *A. persimile*, *Aporosa microstachya*, *Briedelia tomentosa*, *Artocarpus integrifolia* locally, *Villebrunea sylvatica*, *Macaranga gigantea*, *Croton argyратum*, *Ryparia caesia*, *Pittosporum ferrugineum*, *Sterculia hyposticta*, *Ecodia Roxburghii*, *Dracaena Griffithii*, *Parastemon urophyllus*, *Buchananian platyneura*, *Albizzia bubalina* and *A. fasciculata*, *Rhodamnia trinervis*, *Mussaenda macrophylla*, *Eugenia claviflora*, *Garcinia calycina*, *Dracaena linearifolia*, *Glycosmis insularis*, *Anacolosa puberula*, *Apodytes Andamanica*, *Ochna Andamanica*, *Leca sambucina*, *Erioglossum rubiginosum*, *Gnetum gnemon*, *Champereya gnetocarpa*, and, locally, *Pandanus Leram*. *Areca Catechu* here grows quite wild, especially in the lower and more marshy localities. *Alsophila albosetacea* is often met with, but always in few individuals only. The most frequent climbers are *Dinochloa Andamanica*, *Zizyphus subquinquenervis*, *Vitis lanceolata*, *V. pedata*, and *V. repens*, *Derris thyrsiflora*, *Heptapleurum ellipticum*, *Dioscorea glabra*, *Smilax polyacantha*, *Uncaria pilosa*, *Jasminum acuminatissimum*, *Anodendron paniculatum*, *Erycibe paniculata*, *Elaeagnus arborea*, *Gnetum macropodum*, *Calamus Andamanicus* and several other rattans, *Freycinetia insignis* and another species ; besides, *Uvaria micrantha*, *Salacia* and *Hippocratea*, *Griffithia curvata*, *Blumea riparia*, *Embelia microcalyx*, *Parsonsia spiralis*, *Ipomoea vitifolia* and *I. Nicobarica*, *Stenochlaena scandens* and *Lygodium circinatum*. *Pothos scandens* and *Gymnopetalum heterophyllum* often creep up the trunks of the trees. Shrubbery is little developed, and as everywhere else, represented by the slender treelets already enumerated, young tree-growth, and rattans, especially a *Zalacca* (?) Of herbs are chiefly seen *Lasianthus laevicaulis*, *Hedyotis rigida* and *H. costata*, *Homalonema aromaticum* plentifully, *Aglaonema simplex*, *Amomum Fenzlii* plentifully, and some other *Scitamineae* which were in leaf only, *Maranta dichotoma*, *Adenostemma viscosum*, *Blumea myriocephala*, *Amaracarpus pubescens* (restricted to the plutonic rocks), *Corymbis disticha* here and there, and several grasses and sedges, like *Cyperus moestus*, *Hypolytrum latifolium*, *Scleria lithosperma* and *S. Sumatrensis*, *Oplismenus compositus*, *Panicum filipes*, *Kyllingia monocephala*, *Centotheca lappacea*, and, in more open localities, *Thysanolaena acarifera*. Ferns are plentiful but apparently not much varied as regard species ; those observed most frequently are *Nephrodium molle* and other species, *Nephrolepis acuta*, *Lindsaea tenera*, *Davallia speluncae*, and *Selaginella caudata*. On stems



and branches of trees grow chiefly *Asplenium nidus* and *A. macrophyllum*, *Vittaria elongata*, and a number of orchids, like *Oberonia*, *Trichoglottis quadricornuta* frequently, *Phalaenopsis cornu-cervi*, *Pholidota imbricata*, and *Saccolabium obliquum*. Parasites were not observed, but *Henslowia erythrocarpa* was once met with. Owing to the darkness, mosses and liver-mosses are not well-developed here, but along the rocky courses of rivulets patches of *Fissidens* and *Hypna* occur.

Where clearings take place in these forests, *Scleriae* chiefly occupy the terrain, with other grasses, amongst which *Hibiscus Abelmoschus* is often observed.

#### 4. GRASS-HEATHS.

The grass-heaths, as they have been called by Dr. Diedrichsen, occupy the hilly plateau of most of the islands of the northern group, and are physiologically equivalent to the "low forests" of Pegu, more especially with that variety of them in which the trees are more scattered. They form park-like grass-lands,\* which are made up chiefly of *Scleriae*, *Eragrostis Zeylanica*, *Eriachne Chinensis*, *Rhynchospora Wallichii*, *Heteropogon contortus*, several species of *Fimbristylis*, *Imperata arundinacea*, *Spodiopogon* (very hairy) and the hairy *Sorghum muticum* (these two grasses grow chiefly on the outskirts of the tropical forests and at the bottom of the dells, where they attain a height of 5 to 6 feet), *Dimeria* locally, *Chrysopogon aciculatus*, *Eragrostis unioides*, *Digitaria*, and *Cyperus polystachyus*. Of other plants associate chiefly *Gleichenia dichotoma*, *Lycopodium curvatum*, *Pachystoma senile*, which here has always rose-coloured flowers often colouring whole tracts red, *Eulophia graminea*, *Urena lobata*, *Triumfetta rhomboidea*, *Desmodium polycarpum* scantily and *D. heterophyllum*, *Pycnospora nervosa*, *Uraria lagopodioides*, *Lindsaea lanceolata*, *Hedyotis approximata*, *H. Wallichii*, and *H. graminicola*, *Evolvulus linifolius* scantily, *Euphorbia parviflora*, and some others. At the bottom of the numerous dells where rivulets not more than from 2 to 3 feet in breadth have cut courses from 4 to 5 ft. deep, the grasses naturally grow more luxuriantly and entirely hide the water. Such places are usually more or less swampy and in this case a great number of other grasses and plants appear, such as *Cyperus vulgaris*, *C. Haspan*, *C. Iria*, *C. pilosus*, and *C. dilutus*, *Fimbristylis miliacea*, *F. complanata*, *F. diphylla*, *Fuirena umbellata*, *Rhynchospora aurea*, *Scleria laevis*, *S. Sumatrensis*, and a white-fruited form of the last (these prevailing), *Pas-*

\* The northern parts of Karnicobar are for a great part covered by *Saccharum spontaneum*, and it seems that part of the grass-heaths of the northern part of Kamorta (where the wild buffaloes occur) is also covered by this grass. At least I am informed that coarse grass, cutting like a knife, occurs between Tring and Enaka. Those grass-lands which I visited above Tring and of the northernmost part of Kamorta are all the same as those of the southern part.





*palum scrobiculatum* and *P. flexuosum*, *Panicum colonum*, *Isachne miliacea* var. *humilis*, *Arundo Roxburghii* (usually occupying whole tracts where it occurs), *Ceratopteris thalictroides*, *Acrostichum aureum* here and there, *Blechnum orientale*, *Eriocaulon longifolium*, *Smithia sensitiva*, *Jussiaea villosa*, *Adenostema viscosum* var. *elatum*, *Hygrophila salicifolia*, *Limnophila hirsuta*, *Gonostegia hirta*, *Pouzolzia Indica*, and several others. *Lygodium scandens* and *L. pinnatifidum* are occasionally met with in the long grass. Small as these valleys are and often separated only by a low rounded ridge, they have often certain species entirely peculiar to themselves and recurring nowhere else. Such plants as I found only once or twice (but then often in quantity) are *Polygala leptalea*, *Crotalaria calycina* and *C. sericea*, *Blumea flava*, *Utricularia diandra*, *Dysophylla auricularia*, *Colocasia virosa* in large quantity, along with *Nephrodium propinquum*, *Isachne myosotis* and another species (of the habit of *Panicum miliare*), *Polypodium longissimum*, *Helminthostachys Zeylanica*, *Fimbristylis diphylla* var. *villosa*, *F. nutans*, and *F. globulosa*, *Rhynchospora filicaulis*, *Scleria lateriflora*, *Cyrtopera fusca*, *Thrixspermum complexicaule*, *Blyxa Roxburghii*, and *Ancilema ensifolium*.

The shrubbery, more developed at the outskirts of the tropical forests, is scanty on these heaths and very poor in species, consisting chiefly of *Pittosporum ferrugineum*, *Polyphragmon flavescens*, and *Eugenia claviflora* (these three reduced to mere shrubs), *Melastoma Malabathricum* and a small procumbent form of it, *Helicteres obtusa*, *Rubus Moluccanus*, *Blumea balsamifera* (locally), *Vitex negundo* (rare), and an impoverished condition of *Gmelina asiatica*.

The trees are very scattered, and none of them exceed 30 feet in height. The bulk consists of *Fagraea racemosa*, *Aporosa glabrifolia*, *Antidesma Ghaesembilla*, and *Pandanus odoratissimus*, the last more along the swampy valleys and in them. *Casuarina equisetifolia* is seen, especially on the northern part of Kamorta. A stiff *Dendrobium*, a few ferns, as *Polypodium adnascens*, *Davallia solida*, *D. parallela*, etc., as also *Dischidia nummularia* and *D. Bengalensis*, are the chief, if not the only, epiphytes. Here and there one meets with small patches which have evidently been under cultivation at some time, as is indicated by the cucurbits (*Benincasa cerifera*, *Lagenaria vulgaris*, *Cucumis utilissima*, *Momordica* and *Citrullus*) that are still to be seen growing on them.

##### 5. MARINE VEGETATION.

Katchall and Kamorta, the two islands which I had an opportunity of exploring, though separated from one another only by a narrow but deep channel about 8 miles broad, present very different shores: the former is encircled by fringing coral-reefs, while the latter is nearly free from them; the large amount of muddy deposit formed by the action of the sea upon



the soft polycistina-clay of which the island is formed, being unfavourable to the growth of corals. As a consequence the marine vegetation of Kamorta is very poor, and the algæ chiefly found on its shores are *Zonaria* (small), *Hypoglossum*, *Bostrychia*, *Gongroceras*, and such like forms; the numerous seaweeds found washed ashore having possibly all been brought from the submarine coral-reefs of Katchall and other islands. Of phanerogams, *Enhalus acoroides* is the only representative: this is a plant which grows chiefly in shallow waters at the debouchures of rivers, where it often forms whole submarine meadows, apparently little caring for the mud which is carried into the sea, and which often encrusts the whole plant. If we turn to Katchall, the marine vegetation assumes quite a different aspect; not only are small *Sargassa*, *Zonaria* in large specimens, and other melanosperms richly represented, but some of the coral-reefs are so densely covered with numerous olive-brown, green (*Ulva*), and red seaweeds, that it is often difficult to disentangle the different species. Such is especially the case along the western shores of the island. On the submerged coral-reefs are found also the marine phanerogams *Halophila ovalis* and a *Cymodocea*, together with another plant having a very close resemblance to *Enhalus* but much smaller. Fragments of the *Cymodocea* can be seen floating in quantities; which indicates the presence of turtles.

In drawing up the appended enumeration of the plants hitherto found on these islands, I have to express my sincere thanks to Hofrath Dr. Fenzl, Director of the Vienna Museum, who with rare liberality has not only forwarded to me the collections made by Mr. Jelinek during the stay of the Austrian frigate 'Novara' at these islands, but also presented to me a complete set of the duplicates. He has also entrusted to me Mr. Jelinek's MS. Journal, by means of which I have been enabled to note the localities and native names. These vernacular names I have given in the German mode of spelling adopted by Jelinek, as I thought it not advisable to alter them. During Mr. A. O. Hume's cruise round the Nicobars in 1873, a small collection of plants (chiefly leaf-specimens) was made by two native garden-collectors. Some of these proved new to the flora of the Nicobars or furnished additional localities; they are all marked in the following list with "g. c." (garden-collectors).

A number of the plants included in the following list are taken from Dr. Diedrichsen's list. These are marked "*teste D.*" between brackets.





ENUMERATION OF THE PLANTS OF THE NICOBAR ISLANDS.

*DILLENIACEÆ.*

1. *DILLENIA PILOSA*, Kurz in Journ. As. Soc. Beng. 1872, 292 and 1874, 46, vix Roxburgh.—Not unfrequent in the tropical forests of Kamorta.

N. B. The leaves of the Nicobar tree are 1 to  $1\frac{1}{2}$ , in saplings up to 2, feet long, more broadly decurrent to the very base, and while young half-stem-clasping. I formerly identified this tree with Roxburgh's, but I now entertain great doubts as to the correctness of my identification, having ascertained that the insular species is a southern form, which is unlikely to extend so far north as Assam.

*ANONACEÆ.*

2. *UVARIA MICRANTHA*, Hf. and Th.—Not unfrequent in the tropical forests of Kamorta.

N. B. *Uvaria cordata*, Wall. Cat. 6486, is still retained as a synonym of *U. macrophylla* in the Ind. Flora, although Miquel and I have pointed out that it is the typical Blumean *U. ovalifolia*. Hf. and Th. now refer some Bornean and Phillipine specimens to *U. ovalifolia*, Bl. I have not seen the Kew *U. ovalifolia*.—*Goniothalamus Malayanus*, Hf. and Th. is certainly identical with *G. Slingerlandtii*, Scheff. (not *G. Stingelandtii* as the authors of the Indian Flora call it).—*Melodorum prismaticum* Hf. and Th. and *M. rufum* (*Pyramidanthe rufa*, Miq.) are two very different species; the former has the leaves and the simply minutely granular carpels quite glabrous, the stalk very short, and the peduncles longer; while the latter has the leaves more or less tawny pubescent beneath, the carpels strongly rugose-verrucose, minutely tawny puberulous, and the stalk about two-thirds of an inch long.

3. *UNONA DESMOS*, Dun.—Katchall (g. c.).

4. *POLYALTHIA LATERIFLORA*, Kurz in Journ. As. Soc. Beng. 1874, 52.—In the forests of the Nicobars (Stoliczka).

5. *P. sp.*—Not rare in the tropical forests of Kamorta. It is a small tree, with leaves similar to those of *P. Sumatrana* but broader and otherwise different. Flowers and fruits unknown.

6. *POPOWIA PARVIFOLIA*, Kurz in Trim. Journ. Bot. 1875, 324.—Kamorta, in tropical forests; also Karnicobar (Novara 153; Jelinek 42—*tabeleroi*, inc.) and Trice and Track (g. c.).

N. B. The leaves of the Novara specimens are much larger than in mine and the berries 3—1-seeded.

7. *ANONA MURICATA*, L.—Cultivated near the villages of Kamorta and Nankowry, and probably elsewhere.





116 S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands*. [No. 3,

8. *OROPHEA KATSCHALLICA*, Kurz in Trim. Journ. Bot. 1875, 323.—A common shrub or small tree, forming the chief undergrowth in the coral-reef-forests of the eastern parts of Katchall.—It comes nearest to *O. Brandisii*.

9. *SACCOPETALUM HORSFIELDII*, Benn.—Scarce in the coral-reef-forests of the western coast (Modsha tapoo) of Katchall.

N. B. *Bergsmia Sumatrana*, Miq. Suppl. Fl. Sumatr. 389, = *Kings-tonia nervosa*, Hf. and Th.

#### MENISPERMACEÆ.

10. *ANAMIRTA COCCULUS*, W. A.—Common in the tropical forests of Kamorta.

11. *COCCULUS INCANUS*, Coleb.—Frequent in cleared lands, shrub-beries, and along the borders of jungles, etc., of Kamorta and Katchall; Nankowry (Novara 151; Jelinek 130—*mungdrum*, inc.) Trice and Track (Novara 152; Jelinek 176—*thé*, inc.)

12. *CYCLEA PELTATA*, Hf. and Th., var. *PENDULINA* (*C. pendulina*, Miers Contr. III. 243).—Frequent in the beach-forests of Kamorta and Katchall; entering also the coral-reef-forests.

N. B. Dr. Diedrichsen also enumerates *Stephania* as a Nicobarese plant.

13. *ANTITAXIS CALOCARPA*, Kurz in Trim. Journ. Bot. 1875, 324.—Not unfrequent in the swamp-forests of Katchall.

#### NYMPHÆACEÆ.

14. *NYMPHÆA* sp.—Nicobars (*teste* D.).

#### CRUCIFERÆ.

\*15. *BRASSICA JUNCEA*, L.—Apparently cultivated at Malacca, Nankowry.

N. B. *Cheiranthus parryoides*, Hf. and T. And. Ind. Fl. I. 132, = *Parrya nudicaulis*, Regel in Radde Ost. Sibir. 176 (*P. macrocarpa*, R. Br.; Hf. Ind. Fl. I. 131).

#### CAPPARIDEÆ.

16. *CLEOME VISCOSA*, L.—Nicobars (*teste* D.).

17. *GYNANDROPSIS PENTAPHYLLA*, DC.—A weed around the huts of the natives in the beach-forests of Kamorta and Katchall.

18. *CRATEVA MACROCARPA*, Kurz in Trim. Journ. Bot. 1874, 195 and 1875, 324.—Rare in the coral-reef-forests of the western coast of Katchall.

N. B. *Capparis Hasseltii* in Journ. As. Soc. Beng. 1874, 70 is not Miquel's plant. It differs from it by the short (2—3 lin. long) gynophore of the one-seeded berry. My earlier name (*C. ambigua*) must therefore be restored.





### VIOLACEÆ.

19. *ALSODEIA BENGALENSIS*, Wall.—Rare in the tropical forests of Kamorta.

20. *ALSODEIA* sp. Leaves only.—Katchall (g. c.).

N. B. *Viola Hookeri*, Thoms. in Hf. Ind. Fl. I. 183, is apparently the same as *V. glaucescens*, Oudem. in Miq. Ann. Mus. Lugd. Bat. III. 74.—All the localities (except the Kakhyen-hills) of *V. serpens* in my Contr. Burm. Flora in Journ. As. Soc. Beng. 1874, 72 must be referred to *V. Thomsoni*, Oudem. in Miq., l. c.

### BIXINEÆ.

21. *BIXA ORELLANA*, L.—Like wild in the beach-forests of Katchall and Kamorta; entering also the coral-reef-forests; Karnicobar (Jelinek—*oak*, inc.)

22. *RYPARIA CÆSIA*, Bl.—Rather frequent in the tropical forests of Kamorta.

The trees while young but already fruiting freely, have the leaves very large (up to one and a half feet long) and proportionally of a thinner texture and a laxer net-venation, which gives them a very different appearance.

N. B. *Roydsia floribunda*, Hf. Ind. Fl. I. 409, in note, = *R. Phillippinensis*, Turcz. in Bull. Nat. Mosc. 1854. 329 (Cuming 541).

### PITTOSPOREÆ.

23. *PITTOSPORUM FERRUGINEUM*, Ait. (*P. Javanicum*, Bl. ?).—Common in the tropical forests of Kamorta; freely entering the grass-heaths, where it becomes reduced to a mere shrub.

### POLYGALEÆ.

24. *POLYGALA TELEPHIODES*, Willd.—Rather frequent on the grass-heaths of Kamorta but easily overlooked. Having now more carefully examined this species in nature, I consider it a good one. The flowers are whitish, but the keel upwards and the crest are of a beautiful lazuli-blue.

25. *POLYGALA LEPTALEA*, DC.—Here and there amongst the grass along rivulets in the grass-heaths of Kamorta.

N. B. *Xanthophyllum paniculatum*, Miq. Suppl. Fl. Sum. I. 393, must be cut out from the synonyms to *X. flavescens* in Hf. Ind. Fl. I. 209 and in my Contr. Burm. Flora in Journ. As. Soc. Beng. 1874, 79; it differs greatly in the tomentose ovary.





*PORTULACACEÆ.*

26. *PORTULACA OLERACEA*, L.—A weed around the huts of the natives on the beaches of Kamorta and Katchall.

*GUTTIFERÆ.*

27. *GARCINIA SPECIOSA*, Wall.—Not unfrequent in the coral-reef-forests of Katchall; also Nankowry (Novara 167; Jelinek 138—*pajua*, inc.)

28. *GARCINIA CORNEA*, Linn.—Common in the tropical forests of Kamorta; also Nankowry (Novara 168; Jelinek 131—*pajua*, inc.)

29. *GARCINIA CALYCINA*, Kurz in Trim. Journ. Bôt. 1875, 324.—Common in the tropical forests of Kamorta.

N. B. Dr. Hooker (Journ. Linn. Soc. XIV. 485) wishes to correct a supposed error of mine in regard to No. 155 of Maingay's Collections, which I declared (*in litteris*) to be identical with *G. rostrata* (*Discostigma rostratum*, Hassk.). He points out, *inter alia*, a different *androecium*. Both the specimens of the above Maingayan No. in H. B. C. are females, and hence an *androecium* is here out of the question. The male flowers of *G. rostrata* are up to date still unknown,\* and I cannot understand how Teysmann could have sent male specimens to Dr. Hooker, as it is a fact that the only tree in the Buitenzorg garden, upon which Hasskarl based his species, is a female one. Hence I must suspect that Dr. Hooker received *G. Merguiensis* from Teysmann, a male tree of which is cultivated in those gardens. Under these circumstances and after re-examination of the Maingayan specimens I hold to opinion expressed.

30. *GARCINIA* (*XANTHOCHYMUS*) *JELINEKII*, nov. sp.

Arborea, glabra; folia oblonga ad elliptico-oblonga, basi acuminata, petiolo gracili circiter semipollicari suffulta, apiculata, 5—7 poll. longa, tenuiter coriacea, glabra, nervis lateralibus tenuibus subconfertis intra marginem anastomozantibus percursa; paniculæ fructigeræ cymiformes, glabræ, breviter pedunculatæ, petiolo circiter duplo longiores, terminales et laterales; sepala sub fructu 5, semilineam circiter longa, ovata, acuta, glabra; baccæ obovatæ v. sub-globoso-obovoidæ, cerasi majoris magnitudine, apice cum stigmate minuto impressæ, læves, 2—1-spermæ; semina 6—7 lin. longa, compresso-oblonga, lævia. Tillangchong (Novara 169; Jelinek 106).

31. *CALOPHYLLUM INOPHYLLUM*, L.—Frequent in the beach-forests all along the coast of Kamorta and Katchall; also Karnicobar (Novara 166;

\* Miquel, however, seems to have known the male flowers of it, although all he says about them is that they are panicked.



Jelinek 39—*cheang* or *pi-jang*, inc.) ; *puyan*, inc. Katch.—Mr. Jelinek remarks that the Nicobarese build their canoes of this tree.\*

32. *CALOPHYLLUM SPECTABILE*, Willd.—Not unfrequent in the tropical forests of Kamorta.

33. *CALOPHYLLUM WALLICHIANUM*, Planch. and Trian.—Not rare in the tropical forests of Kamorta.

### TERNSTRÆMIACEÆ.

34. *TERNSTRÆMIA PENANGIANA*, Chois.—Not unfrequent in the tropical-forests of Kamorta. A tree 70 to 80 feet high, of which I once met with a stunted individual in the grass-heaths.

N. B. *Gordonia excelsa*, Dyer in Hf. Ind. Fl. I. 291 (not of Blume) var. *a. pubescens*, Dyer, l. c., = *G. dipterosperma* (*Dipterospermæ* sp. Griff. Not. IV. 564). Blume's tree differs so much from the above in the long peduncles, large hirsute capsules, and in the texture and pubescence of the leaves, that it is difficult to understand how it could have come to be identified with the Khasi and Sikkim tree. *G. Singaporeana*, Wall., = *G. anomala*, Spreng. Syst. III. 126 ; Hf. Ind. Fl. l. c. 292 (*Camellia axillaris*, Roxb. in Bot. Reg. 349). This species again is certainly different from Blume's *G. excelsa*, and greatly resembles *Laplacea integerrima*, Miq. It occurs also in Penang, where the late Dr. Stoliczka collected it. Dyer seems not to have read the description in the Bot. Register, but to have relied solely upon the reduced figure when he recognised in it a S. China species. *G. Maingayi*, Dyer, is the same as Miquel's *Laplacea subintegerrima*, which again hardly differs from *L. aromatica*. As Miquel has already pointed out, the distinguishing characters of *Gordonia* and *Laplacea* are not reliable, and in *Eurya*, for example, the free or united styles are not even regarded as of specific value. *Kadsura pubescens*, Miq., is a very distinct species of *Actinidia*, allied to *A. callosa*, L. *Dilleniacea ? nervosa*, Wall. Cat. 6635, from Singapore, = *Shorea sublacunosa*, Scheff. ; *Shorea macroptera*, Dyer, = *Sh. lepidota*, Bl. ; *Hopea micrantha*, Hf. = *H. Mengarawan*, Miq.

### MALVACEÆ.

35. *SIDA CARPINIFOLIA*, L., var. *ACUTA* (*S. acuta*, Burm.).—A common weed in the beach-forests and in cultivated spots. (Novara 160 ; Jelinek).

N. B. *Sida amoena*, Wall. Cat. 1848 from Ava, which Masters doubtfully refers to *Abutilon fruticosum*, Guill. and Perr., has 12 carpels and is simply a small form of *A. Indicum*, Don.

\* I doubt this, for the Nicobarese cut the trees for their canoes far in the interior, while *Caloph. Inophyllum* is a shore tree. The timber of their boats more resembles that of *Artocarpus*.





36. *URENA LOBATA*, L.—A common weed in the beach-forests and in the grass-heaths of Kamorta and Katchall; also Karnicobar (Novara 162; Jelinek 46—*kassinyi*, inc.) and Pulu Milu (Novara, 161; Jelinek 188—*utschu*, inc.).

37. *HIBISCUS ABELMOSCHUS*, L.—Frequent in clearings and open shrubby spots in the tropical forests of Kamorta.

38. *HIBISCUS TILIACEUS*, L.—Common in the beach-forests of Kamorta and Katchall; on the first-named island it occurs also exceptionally in a few patches on the hills along the margin of the tropical forests; also Karnicobar (Novara 158 and 159; Jelinek 3—*taó kowa*, inc.); *imbon*, inc. Katch.

39. *THESPIESIA POPULNEA*, Corr.—Common in the beach-forests, and generally along the whole coast of Kamorta and Katchall; also Karnicobar (Novara 125; Jelinek 75.—*matka*, inc.) and Tillangchong (Novara 126; Jelinek 89).

\*40. *GOSSYPIUM HERBACEUM*, L.—Cultivated at Kamorta, and occasionally around habitations. Its growth on Kamorta (polycistina-clay) is very inferior; it should be tried on the coral-grounds of Katchall, etc., where it will thrive better.

#### STERCULIACEÆ.

41. *STERCULIA MOLLIS*, Wall.—Rather frequent in the beach-forests of Katchall; also Nankowry (Novara 165; Jelinek 145—*fó*, inc.).

N. B. I have now had an opportunity of ascertaining that the specimens of the *Sterculia* referred to *S. parviflora* in my Contrib. Burm. Fl. (Journ. As. Soc. Beng. 1874, 117, sub 10) are a variety of the above. The true *St. parviflora*, Roxb., occurs in the Ava and Sylhet hills, but Masters' Malayan specimens have nothing to do with Roxburgh's species.

42. *STERCULIA HYPOSTICTA*, Miq. Suppl. Fl. Sumatr. 399.—Common in the tropical forests of Kamorta. It is a treelet up to 20 ft. high, with stems of about an inch in thickness.

43. *STERCULIA LONGIFOLIA*, Vent. ?—In the tropical forests of Kamorta. Only leaves, hence the doubtful identification.

44. *STERCULIA CAMPANULATA*, Wall. var. *GLABRIFOLIA*, leaves quite glabrous, cordate-rotundate. Common in the tropical forests of Kamorta and Katchall, and there one of the loftiest trees.

45. *HERITERA TOTHILA*, Kurz in Journ. As. Soc. Beng. 1874, 118 (*H. littoralis*, Dry.). Common in the beach-forests of all the islands; Karnicobar (Novara 214; Jelinek 84—*kamtrad*, inc.).

46. *HELICTERES OBTUSA*, Wall.—A most common meagre shrub on the grass-heaths of Kamorta.





1876.] S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands.* 121

47. *ABROMA AUGUSTA*, L.—Nankowry (Novara 154; Jelinek 172—*komopoang*, inc.).

48. *VISENIA INDICA*, Houtt.—Rather frequent in the tropical forests of Kamorta; also Nankowry (Novara 168; Jelinek 168—*diam*, inc.).

N. B. *Pterospermum diversifolium*, Bl. (Hf. Ind. Fl. I, 367) is reduced by Miquel (Ill. Fl. Arch. Ind. 84) to a synonym of *P. acerifolium*, and he includes in this species *P. fuscum*, Korth also.—*Pt. Blumeanum*, Korth., (Kurz in Journ. As. Soc. Beng. 1874, 120) is identified by Miquel (l. c.) with *P. Javanicum*, Jungh. in Tydsch. Natuurk. Gesch. en Physiol. VII. 306 (Miq. Ill. Arch. Ind. 88). In Journ. As. Soc. Beng. 1874, 122, I have placed *Buettneria crenulata*, Wall. in Hf. Ind. Fl., amongst the doubtful species. I have since come across the specimens of Wallich's *B. crenulata*, which I see have been correctly placed by me in *B. aspera*, Coleb., from which it differs in no respect. But *B. echinata*, Wall. Cat. 1150, of which I have seen nothing but fragments, is a different plant, and I now believe that Masters drew up his description chiefly from this species, the name of which must be restored.

#### TILIACEÆ.

49. *GREWIA CALOPHYLLA*, Kurz.—Not unfrequent in the tropical forests of Kamorta.

N. B. *Grewia Miqueliana*, Kurz in Flora 1872, 398 (with which Maingay's No. 244. is identical), is really a distinct species from the above, differing not only in the characters already mentioned by me but also in having fruits only half the size.

50. *TRIUMFETTA RHOMBOIDEA*, Jacq.—A narrow-leaved variety of this occurs here and there in the dry grass-heaths and around the huts of Kamorta.

N. B. *T. humifusa*, Hassk., = *T. procumbens*, Forst. *T. trilocularis*, Roxb., is more likely a form of *T. semitriloba*, L.

51. *TRICHOSPERMUM JAVANICUM*, Bl.; Clos. in Ann. sc. nat. 4 ser. VIII, 265 (*Bixagrewia Nicobarica*, Kurz in Trim. Journ. Bot. 1875. 325. t. 169).—Not unfrequent in the tropical forests of Kamorta.

N. B. If Loureiro's *Thrixspermum* (Orchideæ), in a corrected form, obtains acceptance amongst botanists, as indeed Reichenbach fil. has already proposed, Asa Gray's *Diclidocarpus* will also supersede Blume's generic name. *Chartacalyx accrescens*, Mast. in Hf. Ind. Fl. I. 382, is in my opinion only a species of *Actinophora*. The difference in the calyx is not of generic value, and as regards the stalked ovary, we should bear in mind, that the ovary of *Actinophora* is globose and constricted at base, and hence that the character of the stalk is one of development only. *Pentace triptera*, Mast. is only a 3- or rarely 4-celled and -winged variety of *P. polyantha*, Hassk.





52. *ELÆOCARPUS FLORIBUNDUS*, Bl.—Here and there in the tropical forests of Kamorta.

53. *ELÆOCARPUS* (*MONOCERAS*) sp.—Nicobars (*teste* D.).

N. B. *Elæo. paniculatus*, Wall., = *E. leucobotryus*, Miq. *Elæo. obovatus*, G. Don. (1831) (Bth. Fl. Austr. I. 281, from Australia), has priority over *E. obovatus*, Arn. (in Act. Acad. Nat. Car. XVIII (1836), 323, from Ceylon), and the latter name has consequently to be changed into *E. Arnotti*.

#### LINEÆ.

54. *HUGONIA* sp. ?—Nicobars (*teste* D.).

N. B. Dr. Hooker states in his Ind. Fl. I. 414 that there can be very little doubt but that *Roucheria* is *Sarcotheca* of Blume; but a reference to Miquel's Illustr. Arch. Ind. 69. t. 30 does not confirm his conclusion.

#### MALPIGHIACEÆ.

55. *HIPTAGE SUMATRANA*, Miq.—Nankowry (Novara 177; Jelinek 158—*Kadoa*, inc.).

I believe not distinct from *H. Javanica*.

#### RUTACEÆ.

56. *EVODIA ROXBURGHIANA*, Bth.—Common in the tropical forests of Kamorta.

57. *ACRONYCHIA CYMINOSMA*, F. Muell.—Tropical forests of Kamorta.

58. *GLYCOSMIS ARBOREA*, Corr., var.  $\beta$ . *INSULARIS*, Kurz in Trim. Journ. Bot. 1876, 38.—Common in the tropical and coral-reef-forests of Katchall and Kamorta; Kondil (g. c.) and Karnicobar (Novara 172).

59. *GLYCOSMIS TRIFOLIATA*, Spreng., var. *LATIFOLIA*, Kurz in Trim. Journ. Bot. 1876, 37.—In the coral-reef-forests of Katchall.

60. *TRIPHASIA TRIFOLIOLATA*, DC.—In the beach-forests of Katchall, entering the coral-reef-forests; Nankowry (Novara 173; Jelinek 111—*arei kene*, inc.); *kalatine*, inc. Katch.

61. *ATALANTIA MACROPHYLLA*, Kurz in Journ. As. Soc. Beng. 1875, 136.—Frequent in the beach-forests of all the islands; Nankowry (Novara 144 and 174; Jelinek 136—*karotje*, inc.).

62. *PARAMIGNYA CITRIFOLIA*, Hf.—Kondil (g. c.)

63. *CITRUS HYSTRIX*, DC.—Rather frequent around the huts on the beaches of Katchall.

64. *CITRUS NOBILIS*, Lour., var.  $\beta$ . *LIMONELLUS*, Kurz in Journ. As. Soc. Beng. 1875, 137.—Frequent and like wild in the beach-forests of Kamorta, Katchall, and other islands; entering the coral-reef-forests.





65. CITRUS DECUMANA, L.—Cultivated on Karnicobar and elsewhere.

N. B. Dr. Diedrichsen records *Feronia elephantum*, Corr., as growing frequently on the Nicobars, but this seems to be an error.

#### OCHNACEÆ.

66. OCHNA ANDAMANICA, Kurz.—Frequent in the tropical forests of Kamorta; also Nankowry (Novara 170; Jelinek 125—*klang-hong*, inc.).

#### BURSERACEÆ.

67. CANARIUM sp.—Nicobars (*teste* D.)

#### MELIACEÆ.

68. AGLAIA ARGENTEA, Bl.—Not unfrequent in the coral-reef-forests of the eastern coast of Katchall.

69. AGLAIA ANDAMANICA, Hiern.—Frequent in the coral-reef-forests of the eastern coast of Katchall.

70. AMOORA GANGGO (*Aglaia Ganggo*, Miq. in Ann. Mus. Lugd. Bat. IV. 47).—Not unfrequent in the coral-reef-forests of Katchall; also Great Nicobar (Novara 175; Jelinek 247—*kaheng*, inc.).

80. CARAPA MOLUCCENSIS, Lamk.—Katchall (g. c.).

#### OLACINEÆ.

81. XIMENIA AMERICANA, Willd.—Karnicobar and Katchall (g. c.) (Novara 171).

82. OLAX IMBRICATA, Roxb., var. MEMBRANIFOLIA, folia 5—6 poll. longa, 2½—3 poll. lata, ovata ad elliptico-ovata, brevissime et obtusiuscule acuminata v. apiculata, succulento-membranacea, in sicco tenuiter membranacea, viridissima, laxe reticulata; cætera ut in specie.—Rather rare in the coral-reef-forests of the eastern coast of Katchall.

83. ANACOLOSA PUBERULA, Kurz.—Common in the tropical forests of Kamorta and Katchall.

84. APODYTES ANDAMANICA, Kurz.—Frequent in the tropical and coral-reef-forests of Kamorta and Katchall; also Great Nicobar (Novara 123; Jelinek 277).

85. CANSJERA RHEEDII, Gmel.—Kondil (g. c.).

86. CHAMPEREYA GNETOCARPA, Kurz in Trim. Journ. Bot. 1875, 325.—Dispersed in the tropical forests of Kamorta; also Karnicobar (Novara 184; Jelinek 85—*tongé*, inc.).

#### CELASTRINEÆ.

87. EVONYMUS JAVANICUS, Bl.—In the tropical forests of Katchall;





124 S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands*. [No. 3, Kondil (g. c.); Great Nicobar (Novara 188; Jelinek 245—*konloláhame*, inc.).

88. *SALACIA PLATYPHYLLA*, Kurz in Journ. As. Soc. Beng. 1875, 203.—In the tropical forests of the eastern coast of Katchall; also Nankowry (Novara 187 and 188; Jelinek 169—*tanglaschi*, inc.) and Great Nicobar (Novara 186; Jelinek 258—*tenfala*, inc.).

Very near to *S. macrophylla*, Bl. The specimens brought home by the Novara have all one-seeded berries, and thus the one I described appears only exceptionally 2-seeded.

89. *HIPPOCRATEA NICOBARICA*, Kurz in Journ. As. Soc. Beng. 1875, 203.—In the tropical forests of the eastern coast of Katchall.

#### *RHAMNEÆ.*

90. *ZIZYPHUS SUBQUINQUENERVIA*, Miq.—Common in the tropical forests of Kamorta and Katchall.

91. *COLUBRINA ASIATICA*, Brongn.—Frequent in the beach-forests of Kamorta and Katchall; also Karnicobar (g. c.); *putjang*, inc. Katch.

92. *GOUANIA* sp.—Nicobars (*teste* D.).

#### *AMPELIDEÆ.*

93. *VITIS LANCEOLARIA*, Roxb.—Common in the tropical and coral-reef-forests of Kamorta and Katchall.

94. *VITIS PEDATA*, Vhl.—Common in the tropical-forests of Kamorta; also Nankowry (Novara 189; Jelinek, 146—*kaje*, inc.).

95. *VITIS TRIFOLIA*, L. (the glabrous variety).—Not unfrequent in the coral-reef-forests of Katchall.

96. *VITIS LINNÆI*, Kurz in Journ. As. Soc. Beng. 1875, 176 (the variety called *V. riparia*, Wall.).—Karnicobar (g. c.).

97. *VITIS REPENS*, WA.—Frequent in the tropical forests of Kamorta.

98. *PTERISANTHES* sp.—Nicobars (*teste* D.).

99. *LEEA GRANDIFOLIA*, Kurz in Trim. Journ. Bot. 1875, 325.—Very common in the beach-forests of the western coast of Katchall, entering also some of the coral-reef-forests; also Trice and Track (Novara 190; Jelinek 186—*hanod*, inc.).

100. *LEEA SAMBUCINA*, L.—Frequent in the beach, coral-reef-, and tropical forests of Kamorta and Katchall; also Nankowry (Novara 76; Jelinek 171); *taku*, inc. Katch.

101. *LEEA ACULEATA*, Bl.—Katchall (g. c.).

#### *SAPINDACEÆ.*

102. *CARDIOSPERMUM HALICACABUM*, L.—Frequent in the beach-forests of Kamorta, Nankowry, and Katchall, especially around huts.





103. *ALLOPHYLUS COBBE*, Bl., not of Hiern (*A. littoralis*, Bl.; Kurz Journ. As. Soc. Beng. 1875. 185).—Common in the beach-forests of Kamorta and Katchall; also Trice and Track (g. c.); Great Nicobar (Novara 180; Jelinek 265—*nongamuje*, inc.).

104. *CUPANIA JACKIANA*, Hiern.—Rather rare in the coral-reef-forests of the eastern coast of Katchall; also Karnicobar (Jack).

105. *CUPANIA ADENOPHYLLA*, Planch.—Nankowry (Novara 187; Jelinek 129—*muju*, inc.).

106. *ERIOGLOSSUM RUBIGINOSUM*, Brand. For. Fl. 108 (*E. edule*, Bl.).—Common in the tropical forests of Kamorta and Katchall; also Nankowry (Novara 179; Jelinek 153—*petal*,\* inc.); *ahaya*, inc. Katch.

107. *SAPINDUS DANURA*, Voigt.—Kondil (g. c.).

108. *SAPINDUS MONTANUS*, Bl.—Frequent in the tropical forests of Kamorta, entering the beach-forests; also Nankowry (Novara 182; Jelinek 141—*nuje*, inc.).

109. *POMETIA TOMENTOSA*, Bth. and Hf.—Only one young tree met with in the coral-reef-forests of the eastern coast of Katchall, but very likely more frequent in the tropical forests of that island.

N. B. *Dodonaea? Lamponga*, Miq. Suppl. Fl. Sumatr. 511, = *Pteleocarpa Malaccensis*, Oliv.

#### ANACARDIACEÆ.

110. *RHUS* sp.—Nicobars (*teste* D.).

111. *MANGIFERA* sp.—Wild in the coral-reef-forests of Katchall, but I have seen only saplings.

112. *BUCHANANIA PLATYNEURA*, nov. sp.

Arbor 40—60-pedalis, glabra, gemmis fulvo-v. ochraceo-sericeis; folia crasse coriacea, lanceolata, in petiolum latum crassum 2—6 lin. longum attenuata et basi sæpius subinequalia, obtuse acuminata, vulgo 4—6 (immo 11) poll. longa, integra, utrinque lucidula, glaberrima, costâ latâ planâ parum prominulâ venisque tenuibus utrâque paginâ prominulis percursa; flores parvi, albi, pedicellis gracilibus fugaciter pilosulis vix lin. longis suffulti, cymulosi et in paniculas numerosas glabras foliis vix longiores terminales dispositi; sepala ovalia, obtusa, circ.  $\frac{1}{2}$  lin. longa, glabra; drupæ oblique ovoideæ, pisi majoris magnitudine, obtusæ, atropurpureæ, glabræ; putamen globosum, durissimum, læve.—*B. splendenti*, Miq., et *B. lucidæ*, Bl., affinis.—Frequent in the tropical forests of Kamorta.

113. *ODINA WODIER*, Roxb.—Frequent in the beach-forests of Ka-

\* "*Petal*" occurs as a name for several different plants in Jelinek's journal; I fear it is meant for '*bétul*' ('just so', 'right so'), a very usual reply of a Malay to a question regarding the pronunciation of a word.





morta and Katchall; on the first-named island here and there also on the hills along the outskirts of the tropical forests. *Gantédl*, inc. Katch.

114. SEMECARPUS HETEROPHYLLUS, Bl.—Frequent in the beach-forests of Katchall, entering the coral-reef-forests; also Karnicobar (Novara 210; Jelinek 30—*pep* or *boab*, inc.)

Var.  $\beta$ . PUBESCENS, paniculae magis fulvo-tomentosae, folia subtus puberula, reticulatione densiore.—Great Nicobar (Novara 209; Jelinek 251).

N. B. I have not seen authentic specimens of Blume's species, but the Nicobar (and Andaman) plant agrees with Sumatran specimens thus named by Miquel. The leaves vary much in size, and in saplings they are up to 2½ ft. long and of proportionally thinner texture and looser net-venation. The pubescent form, collected by Jelinek, stands in the same relation to the original form as my *S. albens* to the glabrous form which I incorrectly named *S. heterophyllus* in my Pegu Report. This tendency to become pubescent is peculiar to a great number of tropical trees, and is not attributable, as some may suggest, to a drier or sunny station, but seems to be rather idiosyncrasy. For we often find the two states growing side by side in the densest shade of the tropical forests. This is the case, for example, with *Micromelum pubescens*, while the perfectly glabrous and the almost villous-pubescent form (which I formerly distinguished as *V. pubescens*) of *Vanqueria spinosa* grow similarly associated in the dry hot forests of Prome. Other examples of the same phenomenon are afforded by *Garuga pinnata* and *G. mollis*, *Chickrassia tabularis* and *Ch. velutina*, *Schrebera Swietenia* and *Sch. pubescens*, *Holarrhena Codaga* and *H. antidysenterica*, *Trewia nudiflora* and the glabrous form, *Berrya Amonilla* and *B. mollis*, *Grewia laevigata* and its pubescent form, *Walsura trijuga* and *W. pubescens*, *Amoora Rohituka* and *A. Aphanomyxis*, *Terminalia catappa* and its pubescent form, and numerous others. In two only of these, viz., in *Berrya* and *Micromelum*, have I observed real intermediate and therefore connecting states. In most of these cases not only are the vegetative parts affected but the calyx and the corolla also.

#### CONNARACEÆ.

115. ROUREA FLORIBUNDA, Miq.—In the tropical forests of Katchall; also Nankowry (Novara 211; Jelinek 140—*majing*, inc.) A tree 3—4 feet in girth.

115-6. ROUREA WALLICHIANA, Planch. ? (*Connarus mimosoides*, Vhl. Symb. III. 87).—Nicobars (*teste* Vahl.)

116. CONNARUS MAINGAYI, Hf.—Great Nicobar (Novara 237; Jelinek 260—*el*, inc.).





*LEGUMINOSÆ.*

117. *CROTALARIA CALYCINA*, Schrank.—Kamorta, rare along a rivulet in the grass-heaths.
118. *CROTALARIA SERICEA*, Retz.—Kamorta, rare along a rivulet in the grass-heaths east of Enaca.
119. *SMITHIA SENSITIVA*, Ait.—Kamorta, locally common along rivulets in the grass-heaths.
120. *DESMODIUM UMBELLATUM*, DC.—Common in the beach-forests all along the coast of all the islands; Nankowry (Novara 231; Jelinek 80—*kenjap*).
121. *DESMODIUM (DICERMA) sp.*—Nicobars (*teste* D.)
122. *DESMODIUM RECURVATUM*, Grah.—Kondil (g. c.).
123. *DESMODIUM GANGETICUM*, DC.—Nicobars, no precise locality given (Novara 233; Jelinek.).
124. *DESMODIUM POLYCARPUM*, DC.—Not unfrequent in the shrubberies along the margins of the tropical forests of Kamorta; Great Nicobar (Novara 234; Jelinek 234—*ptealam*, inc.).
125. *DESMODIUM HETEROPHYLLUM*, DC.—Not unfrequent in the grass-heaths and also amongst shrubbery of the beach-forests of Kamorta.
126. *PYCNOSPORA NERVOSA*, WA.—Rather frequent in the grass-heaths of Kamorta.
127. *URARIA PICTA*, Desv.—Here and there in the grass-heaths of Kamorta.
128. *URARIA LAGOPODIOIDES*, DC.—Frequent in the grass-heaths of Kamorta.
129. *ALYSICARPUS sp.*—Nicobars (*teste* D.).
- N. B. *Pisum sativum*, L., var. *arvense* is cultivated by the convicts on Kamorta, but succeeds very badly. Along with it come up (in a similar starved condition) *Vicia sativa*, L. and *Lathyrus Aphaca*, L., which have no doubt been introduced from Bengal.
130. *ABRUS PRECATORIUS*, L.—Karnicobar (Novara 226; Jelinek —*tanjam*, inc.); Nankowry (Novara 226; Jelinek 110—*kaipi*, inc.).
131. *CLITOREA TERNATEA*, L.—Nicobars (*teste* D.).
132. *ERYTHRINA INDICA*, L.—Not unfrequent in the beach-forests of Kamorta and the eastern coast of Katchall; also Karnicobar (Jelinek —*bamillo*, inc.).
133. *MUCUNA GIGANTEA*, DC.—Nankowry (Novara 235 and 236; Jelinek 166 and 155—*ipuë*).
134. *CANAVALIA VIROSA*, WA.—Not unfrequent amongst shrubbery along the outskirts of the tropical forests and in the beach-forests of Kamorta and Katchall; Nankowry (Novara 230; Jelinek 142—*komipuë*); *banyu*, inc. Katch.





N. B. Some species of *Phaseolus* and also *Dolichos Lablab*, L., are cultivated by the convicts on Kamorta, but do badly.

135. *VIGNA LUTEA*, A. Gray.—Common along the sand-beaches and in the beach-forests along the coast of all the islands (Novara 229; Jelinek 103) *deimo-opo*, inc. Katch.

\*136. *CAJANUS INDICUS*, L.—Nicobars, cultivated (*teste* D.).

137. *FLEMINGIA STROBILIFERA*, Ait.—Along the outskirts and in open bushy parts of the tropical forests of Kamorta, frequent; Nankowry (Novara 232; Jelinek—32—*karan kofot*, inc.).

138. *DALBERGIA* sp.—Nicobars (*teste* D.).

139. *DERRIS ULIGINOSA*, Bth.—Frequent in the beach-forests and in the drier parts of the mangrove-swamps of all the islands; Great Nicobar (Novara 238; Jelinek 248—*jlonja*, inc.).

140. *DERRIS SCANDENS*, Bth.—Kamorta, not unfrequent along the coast, especially in the beach-forests and around mangrove-swamps.

141. *DERRIS THYRSIFLORA*, Bth. (*D. polythyrsa*, Miq. Suppl. Fl. Sumatr. 297).—Common in the tropical forests of Kamorta.

142. *PONGAMIA MITIS* (*Robinia mitis*, L.; *P. glabra*, Vt.).—Common in the beach-forests of all the islands; (Novara 181).

143. *SOPHORA TOMENTOSA*, L.—Rather frequent in the beach-forests of Kamorta and Katchall; Karnicobar (Novara 239; Jelinek 56—*ature*, inc.).

144. *PELTOPHORUM FERRUGINEUM*, Vog.—Here and there in the beach-forests and coral-reef-forests of Kamorta; Nankowry (Novara 240; Jelinek 134—*klarenje*, inc.).

N. B. *Cesalpinia dasyrhachis*, Miq. Suppl. Fl. Sum. 292, is a new species of *Peltophorum*.

145. *CESALPINIA NUGA*, Ait.—Frequent in shrubbery of the beach-forests and around mangrove-swamps, entering also the tropical forests of Kamorta and Katchall.

146. *CESALPINIA BONDUC*, L.—Not unfrequent amongst shrubbery of the beach-forests of Kamorta and Katchall.

\*147. *CESALPINIA PULCHERRIMA*, Sw.—Nankowry, at the village of Malacca.

148. *CASSIA OCCIDENTALIS*, L.—A weed in the beach-forests around the huts of Kamorta.

149. *BAUHINIA FERRUGINEA*, Wall.—Great Nicobar (Novara 241; Jelinek 222—*nonong toak*, inc.).

150. *APZELIA BIJUGA*, A. Gray.—Frequent in the beach-forests of Kamorta and Katchall.

\*151. *TAMARINDUS INDICA*, L.—Nicobars (*teste* D.).





1876.] S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands.* 129

152. *CYNOMETRA BIJUGA*, Spanogh.—Not unfrequent in the beach- and coral-reef-forests of Kamorta and Katchall.

153. *CYNOMETRA RAMIFLORA*, L.—Nicobars (Novara 145), probably only cultivated.

154. *ENTADA SCANDENS*, Bth. (the typical form with retuse leaflets). Frequent in the forests, especially the beach-forests, of Kamorta; Nankowry (Novara 228; Jelinek—*otoaka*, inc.).

155. *ADENANTHERA PAVONINA*, L.—Great Nicobar (Novara 227; Jelinek 278).

N. B. *Mimosa* and *Acacia* are given as Nicobarese plants in Diedrichsen's list.

156. *ALBIZZIA STIPULATA*, Boiv.—Common in the tropical forests of Kamorta.

157. *ALBIZZIA LITTORALIS*, T. et B.—Nankowry (Novara 243; Jelinek 134); Great Nicobar (Novara 244; Jelinek 239—*unjiha*, inc.).

158. *ALBIZZIA BUBALINA* (*Pithecolobium bubalinum*, Bth.; *Pitheco. oppositum*, Miq. Suppl. Fl. Sum. 283).—Not unfrequent in the tropical forests of Kamorta; Nankowry (Novara 242; Jelinek 133—*kawas*, inc.).

N. B. *Pithecolobium confertum*, Bth., = *Albizzia splendens*, Miq. Suppl. Fl. Sum. 280. Benthams is correct in his identification of *Pitheco. acutangulum*, Miq., with *P. angulatum*, Bth. *Mastersia cleistocarpa*, Bak. in Hf. Ind. Fl. II. 195, = *M. Assamica*, Bth. in Linn. Trans. xxv. 300. t. 34.

159. *ALBIZZIA CLYPEARIA* (*Pithecolobium clypearia*, Bth.).—Only once met with in the coral-reef-forests of the eastern coast of Katchall.

160. *ALBIZZIA FASCICULATA* (*Pithecolobium fasciculatum*, Bth.), the form called *Pitheco. macrophyllum*, T. et B.—Here and there in the tropical forests of Kamorta.

N. B. I follow v. Mueller and Scheffer in throwing together *Albizzia* and *Pithecolobium*, the differences pointed out by Benthams appearing to me not to be of generic value.

#### ROSACEÆ.

161. *PARASTEMON UROPHYLLUS*, DC., var. ?  $\beta$ . *MACROCARPA*, folia latiora et rigidiora; drupæ pollicem longæ, pulcherrime rosæ.—A beautiful tree 30 to 40 feet in height, with a dense round crown, not unfrequent in the tropical forests of Kamorta.

162. *RUBUS MOLUCCANUS*, L.—Not unfrequent in the shrubberies along the outskirts of the tropical forests (and often entering them) of Kamorta; Nankowry (Novara 225; Jelinek 170—*klintuum*, inc.).





130 S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands*. [No. 3,

N. B. The rose is cultivated at the penal station of Kamorta and thrives beautifully.

### RHIZOPHORACEÆ.

163. RHIZOPHORA MUCRONATA, Lamk.—Common in the mangrove-swamps of all the islands. (Novara 215).

164. CERIOPS CANDOLLEANA, Arn.—Karnicobar.

165. BRUGUIERA GYMNO RHIZA, Lam.—Common along the coast of all islands in the mangrove-forests where these come in contact with fresh-water; Karnicobar (Novara 216; Jelinek—*tafāta* or *lintji*, inc.).

166. CARALLIA INTEGERRIMA, DC.—Rare in the tropical forests of Kamorta.

### COMBRETACEÆ.

167. TERMINALIA CATAPPA, L.—Common in the beach-forests all along the coasts of the islands; *gumlan*, inc. Katch.

168. TERMINALIA sp. nov.—Frequent in the tropical forests of Kamorta.—One of the highest trees, much resembling the preceding in habit, but the leaves are much narrower and more cuneate and altogether of a different appearance. Fruits and flowers unknown.

169. TERMINALIA CITRINA, Roxb., var. MALAYANA, petioles longer and slender, leaves more acuminate, drupes little more than half the size.—Nankowry (Novara 75; Jelinek 132—*ohang*, inc.).

170. LUMNITZERA LITTOREA, Voigt.—A single tree found along one of the rivulets on the grass-heaths west of Enaca, Kamorta. It is a beach-forest-tree, the occurrence of which on polycistina-clay is abnormal.

171. LUMNITZERA RACEMOSA, Willd.—Great Nicobar (g. c.).

172. COMBRETUM SQUAMOSUM, Roxb.—Not unfrequent in the tropical forests of Katchall.

173. COMBRETUM EXTENSUM, Roxb.—Karnicobar (g. c.).

174. GYROCARPUS JACQUINI, Roxb.—Coast-forests of the Nicobars.

### MYRTACEÆ.

\*175. PSIDIUM GUYAVA L.—In the beach-forests, around the huts of the natives, like wild on Kamorta and Katchall.

176. RHODAMNIA TRINERVIA, Bl., var. CONCOLOR (*R. concolor*, Miq.). Common in the tropical forests of Kamorta.

177. EUGENIA JAVANICA, Lamk.—Frequent in the beach-forests, and generally in the jungles bordering the sea, of Katchall; Pooloo Milu (Novara 223; Jelinek 206—*ipo*, inc.).

178. EUGENIA OCCLUSA (*Syzygium occlusum*, Miq.).—A lofty tree common in the coral-reef- and tropical forests of Katchall.





1876.] S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands*. 131

179. *EUGENIA CLAVIFLORA*, Roxb.—A tree (40 + 10 + 3 — 4) rather scarce in the tropical forests of Kamorta, but a shrubby variety of it is common on the grass-heaths of Kamorta; Great Nicobar (Novara 224; Jelinek 261—*antanyeschumna*, inc.).

180. *EUGENIA* (*ACMENA* ?) sp., in leaf only.—Frequent in the tropical forests of Kamorta.

181. *BARRINGTONIA RACEMOSA*, DC.—Frequent in the tropical and coral-reef-forests of Kamorta and Katchall; Karnicobar (Novara 220; Jelinek 64—*pisseon*, inc.); Great Nicobar (Novara 231; Jelinek 220—*sura*, inc.).

182. *BARRINGTONIA ASIATICA*, Kurz in Pegu Rep. A. 65 (*B. speciosa*, L. f., non Forst.)—Common in the beach-forests all along the coasts of the islands; Karnicobar (Novara, Jelinek—*kenjao* or *hoa*, inc.); *howa*, inc. Katch.

### MELASTOMACEÆ.

183. *OSBECKIA* sp.—Nicobars (*teste* D.)

184. *MELASTOMA MALABATHRICUM*, L. and a small procumbent form of it not higher than  $\frac{1}{2}$ —1 foot.—Common as shrubbery along the outskirts of the tropical forests and on the grass-heaths of Kamorta, the procumbent form restricted to the latter.

185. *MELASTOMA POLYANTHUM*, Bl., var. ?—Nicobars (Novara 217; Jelinek).

186. *OTANTHERA NICOBARENSIS*, T. et B. in Naturk. Tydschr. Ned. Ind. XXIV. 333.—Tropical forests of Katchall; Great Nicobar (Novara 219; Jelinek 172).

187. *DISSOCHLETA*, sp.—Nicobars (*teste* D.).

188. *PTERNANDRA CÆRULESCENS*, Jack.—Rare in the tropical forests of Kamorta.

189. *MEMECYLON SUBTRINERVIUM*, Miq. Suppl. Fl. Sumatr. 322.

Var. *GRANDIFOLIA*, folia 8—10 poll. longa, magis coriacea et nitidiora, nervis minus distinctis; petioli crassiores; pedicelli solitarii v. bini, 2—3 lin. longi, subgraciles, pedunculum 1—2 lin. longum articulatum supra foliorum cicatrices erumpentem terminantes; baccæ submaturæ obovoideo-oblongæ, c. 7—8 lin. longæ, læves, glabræ, calycis limbo speciei coronatæ.—Rare in the tropical forests of Kamorta. A small tree, which I identify with Miquel's *M. subtrinervium*, on the supposition that the berries in Miquel's plant would, when full grown, reach a similar size. As a species it is a very distinct one, being one of the few that have the berry not globular.

N. B. *Memecylon pauciflorum*, Wall. Cat. 4114 (Triana in Trans. Linn. Soc. XXVIII. 159), = *Canthium glomerulatum*, Miq.





*ONAGRARIÆ.*

190. *JUSSIEA VILLOSA*, Lamk.—Locally frequent along marshy rivulets on the grass-heaths of Kamorta.

*SAMYDACEÆ.*

191. *CASEARIA GLABRATA*, Bl., var. leaves larger and broader at the base, which is more rounded or almost cordate on the one side, in this respect more resembling those of *C. angustata*, T. et B., which may turn out to be only a form of it. Capsules fleshy, elliptical, nearly an inch long, smooth and glabrous. A tree (30 — 50 feet + 15 — 20 + 3 — 4) rare in the tropical forests of Kamorta.

*PASSIFLORACEÆ.*

192. *MODECCA CORDIFOLIA*, Bl.—Great Nicobar (Novara 155; Jelinek 229—*unaha*, inc.). To this should be referred *M. heterophylla* of my Andam. Rep. App. A. 39 (not of Blume).

193. *MODECCA NICOBARICA*, Kurz in Trim. Journ. Bot. 1875, 326. Frequent in the beach-forests of Katchall; Nankowry (Novara 156; Jelinek 148—*tenjam*, inc.).

\*194. *CARICA PAPAYA*, L.—Cultivated and occasionally like wild in the beach-forests of Kamorta and Katchall. (Novara 157; Jelinek); *lapú*, inc. Katch.

*CUCURBITACEÆ.*

195. *GYMNOPETALUM HETEROPHYLLUM*, Kurz in Trim. Journ. Bot. 1875, 326.—Not unfrequent in the tropical forests and locally in recently cultivated parts of the grass-heaths of Kamorta.

N. B. The difference between *Trichosanthes* and *Gymnopetalum* is very slight indeed. The corolla in *Trich. integrifolia* (*Cucumis integrifolia*, Roxb.) is as often entire as it is irregularly and more or less deeply cut; the colour of the corolla thus alone remains as a distinguishing mark between the two genera!

196. *LAGENARIA VULGARIS*, Savi, var. ?—Wild or like wild along the beach-forests of Katchall. The petioles and leaves are covered with bristles arising from calcareous incrassate tubercles; the fruits are of the shape and size of large billiard-balls.

197. *LUFFA CYLINDRICA*, Roem.—Along the outskirts of the tropical forests of Kamorta.

\*198. *BENINCASA CERIFERA*, Savi.—Cultivated and as wild in the neglected "gardens" on the grass-heaths of Kamorta.

\*199. *CUCUMIS MELO*, L., var. *UTILISSIMA*, Naud.—Kamorta, as wild in neglected "gardens" on the grass-heaths.





1876.] S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands.* 133

N. B. Besides these *Momordica* and *Citrullus* were observed as cultivated plants.

*UMBELLIFERÆ.*

200. *HYDROCOTYLE* sp.—Nicobars, (teste D.).

*ARALIACEÆ.*

201. *HEPTAPLEURUM ELLIPTICUM*, Seem.—Not an unfrequent climber in the tropical forests of Kamorta and Katchall; Great Nicobar (Novara 170; Jelinek 263—*kenankun*, inc.).

202. *ARTHROPHYLLUM BLUMEANUM*, Zoll. and Mor.—A palm-like tree up to 30 feet high and higher, frequent in the tropical forests of Kamorta.

*CORNACEÆ.*

203. *ALANGIUM SUNDANUM*, Miq.—A large climber of the coral-reef-forests of Katchall, more frequent in the tropical forests.

*CAPRIFOLIACEÆ.*

204. *SCYPHIPHORA HYDROPHYLLACEA*, Gærtn.—Rare in the mangrove-swamps of Kamorta.

N. B. This genus is generally ascribed to *Rubiaceæ*, but the structure of the ovary and the position of the ovules are tell-tale marks of its caprifoliaceous descent.

*RUBIACEÆ.*

205. *PSYCHOTRIA NICOBARICA*, Kurz in Trim. Journ. Bot. 1875, 328.—Frequent in the coral-reef-forests of the eastern coast of Katchall.

206. *PSYCHOTRIA TYLOPHORA*, Kurz, l. c.—Not unfrequent in the tropical and coral-reef-forests of Katchall.

207. *PSYCHOTRIA ANDAMANICA*, Kurz, l. c.—Rather frequent in the coral-reef- and tropical forests of Katchall and Kamorta.

208. *PSYCHOTRIA CONNATA*, Wall.—Karnicobar (g. c.).

209. *AMARACARPUS PUBESCENS*, Bl.—Frequent in the tropical forests of Ho-Ho or Ulala Bay, on plutonic rocks.

N. B. Diedrichsen gives *Serissa* as a Nicobarese plant.

210. *IXORA PAVETTA*, Roxb.—Not unfrequent in the beach- and coral-reef-forests of Katchall.

211. *IXORA WEBEREFOLIA* (*Pavetta weberafolia*, Wall. Cat. 6182; Don. Gen. System III. 575).—Frequent in the tropical and coral-reef-forests of Katchall and Kamorta; Great Nicobar (Novara 92; Jelinek 264—*henjuan*, inc.); Karnicobar (Novara 93; Jelinek 55—*Joōjonkuo*, inc.).—Resembles *Webera Asiatica*, Bedd., to such a degree that it is frequently mistaken for it. My *Stylocoryne Webera* in And. Rep. also belongs here.





212. *IXORA CUNEIFOLIA*, Roxb., var. *MACROCARPA*, berries the size of a large pea.—Pulu Milu (Novara 91 ; Jelinek 203—*hiloga*, inc.).

213. *IXORA KURZIANA*, T. et B. in *Natuurk. Tydsch. v. Ned. Ind.* XXVII. 100 (sub *Pavetta*).—Rare in the tropical, more frequent in the coral-reef-forests of Katchall.

214. *IXORA BARBATA*, Roxb.—Great Nicobar (g. c.).

215. *IXORA MACROSIPHON*, Kurz in *Trim. Journ. Bot.* 1875, 327.—Great Nicobar (Novara 89 ; Jelinek 254—*hilogo*, inc.).

216. *IXORA BRUNNESCENS*, Kurz in *Journ. As. Soc. Beng.* 1872, 317.—Frequent in the coral-reef-forests of Katchall ; Karnicobar (Novara 87 and 88 ; Jelinek—*lunge*, inc.).

217. *IXORA VILLOSA*, Roxb.—Kondil (g. c.)

218. *LASIANTHUS LEVICAULIS*, Kurz in *Trim. Journ. Bot.* 1875, 327.—Rather frequent in the tropical forests of Kamorta.

219. *GYNOCHTODES MACROPHYLLA*, Kurz in *Journ. As. Soc. Beng.* 1872, 314 and *Trim. Journ. Bot.* 1875, 326.—In the beach-forests of Katchall ; Nankowry, near Malacca.

220. *GUETTARDA SPECIOSA*, L.—Common in the beach-forests of all the islands ; Trice and Track (Novara 97 ; Jelinek 185—*towalé*, inc.).

221. *POLYPHRAGMON FLAVESCENS* (*Helospora flavescens*, Jack).—Not unfrequent in the tropical forests of Kamorta, where it grows to be a tree up to 30 feet high, but very frequent on the grass-heaths of the same island, where it is reduced to a mere shrub ; Karnicobar (Novara 99 and 100 ; Jelinek—*kointuel*, inc.).

N. B. What authors (except Miquel) take to be cells are in reality the ovules, which are attached usually in two rows to the inner angles of the 4—7 cells of which the ovary consists. The seeds have a crustaceous testa. The berries of the Nicobar tree are larger and usually 6-celled and may form a distinct species.

N. B. *Bobea hirsuta*, T. et B., = *Polyphragmon trichocaulon*, Miq. ; *Greenia latifolia*, T. et B., = *Polyphr. Amboinicum*, Miq.

222. *GARDENIA RESINIFERA*, Korth. (the form called *G. glutinosa*, T. et B.). A tree (40—50 + 20 — 25 + 4 — 5) not unfrequent in the tropical forests of Kamorta.

223. *GRIFFITHIA CURVATA*, Kurz in *Trim. Journ. Bot.* 1875, 326.—Frequent in the tropical and the coral-reef-forests of Kamorta and Katchall.

224. *WEBERA DENSIFLORA*, Wall.—Frequent in the coral-reef-forests of Katchall.

224. *HYPOBATHRUM RACEMOSUM* (*Randia racemosa*, Roxb. ; *Peltunga Roxburghii*, DC.).—Not unfrequent in the coral-reef-forests of Katchall, especially near marshes ; Great Nicobar (Novara 102 ; Jelinek 252—*pebel*, inc.).





225. *MUSSENDIA MACROPHYLLA*, Wall.—Not unfrequent along the outskirts of the tropical forests of Kamorta ; Nankowry (Novara 95 ; Jelinek 160).

226. *MUSSENDIA JELINEKII*, nov. sp.

Fruticosa, subglabra ; folia lineari-lanceolata ad elongato-obovato-lanceolata, basi cuneatâ acuminata et in petiolum longum v. longiusculum ( $\frac{1}{2}$ —2 pollicarem) attenuata, breviuscule acuminata, membranacea, 9—4 poll. longa, integra, glabra v. subtus pallidiora et sub lente minute pubera ; flores parviusculi, aurantiaci, pedicellis 1—1 $\frac{1}{2}$  lin. longis suffulti et in corymbum brachiatum glabrum foliis multo breviorum terminalem disgesti ; calycis glabri tubus cylindraceo-oblongus, 1 $\frac{1}{2}$  lin. longus, dentibus  $\frac{1}{2}$  lin. longis, omnibus lineari-subulatis v. uno alterove florum 1—2 tantum in laminam foliaceam albam longissime (c. 1. poll.) petiolatam exescente ; corollæ tubus 7—8 lin. longus, glaber, intus fauce villosus, lobi vix 2 lin. longi, oblongi, obtusiusculi, supra pulverulento-tomentelli.

Allied (possibly too closely ?) to *M. longifolia*. The opposite leaves are alternately much smaller and shorter petioled. Great Nicobar (Novara 90 ; Jelinek 250—*tajhuge*, inc.).

227. *ADENOSACME LONGIFOLIA*, Wall.—Great Nicobar (Novara 222 ; Jelinek 224).

228. *MORINDA CITRIFOLIA*, L., var. *BRACTEATA* (*M. bracteata*, Roxb.).—Common in the beach-forests of Kamorta and Katchall, entering also the coral-reef-forests ; Karnicobar (Novara 101 ; Jelinek 13—*luron*, inc.).

229. *NAUCLEA EXCELSA*, Bl.—A tree (60 + 20 — 30 + 4 — 5) frequent in the tropical forests of Kamorta.

230. *UNCARIA PILOSA*, Bth.—Frequent in the tropical forests of Kamorta.

231. *OPHIORRHIZA MUNGOS*, L.—Common in the beach- and coral-reef-forests of all the islands, especially frequent at the base of the catechu-palms ; Pulu Milu (Novara 96 ; Jelinek 193—*kuju*, inc.).

232. *HEDYOTIS RIGIDA*, Miq.—Frequent in the tropical forests of Kamorta.

233. *HEDYOTIS PARADOXA*, nov. sp.

*H. hispida*, Retz., arete affinis, attamen corolla duplo major, fauce pubescens ; capsula globosa uti in speciebus *Oldenlandiæ*, calycis lobis brevibus coronata ; caules hispiduli ; folia supra glabra, subtus minute puberula. Great Nicobar (Novara. 94 ; Jelinek 225—*sanunkun*, inc.). (Common on the Andamans).

234. *HEDYOTIS APPROXIMATA*, WA., var. (*Spermacoce tubularis*, R. Rr. in Wall. Cat.).—Pretty frequent on the grass-heaths of Kamorta, especially along rivulets.

235. *HEDYOTIS COSTATA* (*Spermacoce costata*, Roxb. ; *H. coerulea*,





136 S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands*. [No. 3, Korth., non WA.)—Not unfrequent in open spots and along the outskirts of the tropical forests of Kamorta.

N. B. *Hedyotis cœrulea*, WA. (non L., nec Korth.), has to be changed into *H. cyanantha*.

236. *HEDYOTIS WALLICHII* (*H. galioides*, Wall. Cat. 866, non F. Muell.).

Herba annua, erecta, 1—2-pedalis, parce pilosa; stipulae longe fimbriatae, hispido-pilosae; folia magis minusve ovato-lanceolata ad ovalia, basi acuta, petiolo 1—1½ lin. longo parce piloso suffulta, acuta v. acuminata, ½—1½ poll. longa, integra, membranacea, utrinque plus minusve pilis longis adspersa; flores minuti, pallide cœrulei, pedicellis capillaribus 3—4 lin. longis suffulti, cymas glabras dichotomas in paniculas axillares et terminales dispositas formantes; calyx glaber, vix semilineam longus, dentibus lanceolatis acutis; capsula hemisphaerica, glabra, lineam fere in diametro, calycis dentibus brevibus coronata.

Common amongst grass in the grass-heaths, especially in those of the northern parts of Kamorta.

237. *HEDYOTIS GRAMINICOLA*, Kurz in Trim. Journ. Bot. 1875, 326.—Common amongst grass in the grass-heaths of Kamorta.

238. *HEDYOTIS RACEMOSA*, Lamk.—Great Nicobar (g. c.).

239. *HEDYOTIS ANDAMANICA*, Kurz in Journ. As. Soc. Beng. 1872, 311.—Rather rare in somewhat open places in the tropical forests of Kamorta.

240. *KNOXIA CORYMBOSA*, Willd.—Trice and Track (g. c.).

### COMPOSITÆ.

241. *VERNONIA CINEREA*, Less.—A weed in cultivated lands and around the huts of the natives in the beach-forests of Kamorta; Tillangchong (Novara 85; Jelinek 102).

242. *VERNONIA (CYANOPSIS) sp.*—Nicobars (*teste* D.).

243. *ADENOSTEMMA VISCOSUM*, Forst.—One variety (var. *latifolia*, Don) frequent in the coral-reef- and tropical forests of Kamorta and Katchall; the other (var. *elatum*, Don), with succulent thick leaves, rather frequent in swampy rivulets of the grass-heaths of Kamorta.

244. *AGERATUM CONYZOIDES*, L.—A common weed around the huts of the natives and in the beach-forests of Kamorta and Katchall.

245. *BLUMEA FLAVA*, DC.—Locally along rivulets of the grass-heaths of Kamorta.

246. *BLUMEA LACERA*, DC.—Frequent in the beach-forests and around the penal settlement of Kamorta.

247. *BLUMEA MYRIOCEPHALA*, DC.—Here and there in shady ravines and in tropical forests of Kamorta; Trice and Track (g. c.); Great Nicobar (Novara 83: Jelinek 218—*kongé*, inc.).





1876.] S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands.* 137

248. *BLUMEA RIPARIA*, DC.—Large scandent shrub, frequent in the tropical forests of Kamorta.

249. *BLUMEA BALSAMIFERA*, DC.—Springing up freely in cleared jungle-land and not unfrequent along the outskirts of the forests and amongst shrubbery of Kamorta.

250. *PLUCHEA INDICA*, Less.—Frequent along the coast of Kamorta and Katchall; Trice and Track (g. c.).

251. *SPHERANTHUS MICROCEPHALUS*, Willd.—Here and there on the grass-heaths of Kamorta, also springing up in cleared jungle-land.

252. *ECLIPTA* sp.—Nicobars (*teste* D.).

253. *SYNEDRELLA NODIFLORA*, Gärtn.—A weed near the convict-gardens of Kamorta and most probably introduced from the Andamans, where it has now become a common weed.

254. *WEDELIA SCANDENS*, C. B. Clarke.—Common in the tidal forests and the beach-forests of Kamorta and Katchall; Karnicobar (g. c.); Nankowry (Novara 84; Jelinek 112—*katei*, inc.); *kathai*, inc. Katch.

255. *SPILANTHES* sp.—Nicobars (*teste* D.).

256. *BIDENS* sp.—Nicobars (*teste* D.).

#### CAMPANULACEÆ.

257. *LOBELIA* sp.—Nicobars (*teste* D.).

258. *SCÆVOLA KÆNIGII*, Vhl.—Common in the beach-forests, but also on rocky (chiefly calcareous) ground near the sea along the coasts of all the islands; Karnicobar (Novara 36; Jelinek 58—*tuful*, inc.).

N. B. *Stylidium tenellum*, Kurz in Flora 1872, 304, non Sw., is a new species, which I now propose to call *St. roseum*.

#### MYRSINÆÆ.

259. *MESA RAMENTACEA*, Roxb.—Frequent in the tropical forests of Kamorta.

260. *EMBELIA MICROCALYX*, Kurz in Trim. Journ. Bot. 1875, 328. Frequent in the tropical forests of Kamorta.

Allied to *Emb. canescens*, Jack.

261. *MYRSINE CAPITELLATA*, Wall. var.? (the form which goes under the name *M. avenis*, DC.).—Rare in the tropical forests of Kamorta. A small bushy tree about 30 feet high.

262. *ARDISIA LITTORALIS*, Andr. (*Climacandra obovata*, Miq.).—Common in the beach-forests of all the islands; Karnicobar (Novara 142; Jelinek 18—*mekron*, inc.).

263. *ÆGICERAS CORNICULATA*, Blanco.—Nankowry (Novara 143; Jelinek 157—*kadoa*, inc.).





*SAPOTACEÆ.*

264. *SIDEROXYLON ATTENUATUM*, DC.—Frequent in the tropical forests of Kamorta; Great Nicobar (g. c.); Karnicobar (Novara 146; Jelinek 11—*makelinioko*, inc.).

265. *SIDEROXYLON GRANDIFOLIUM*, Wall.—A lofty tree, rare in the tropical forests of Kamorta.

266. *MIMUSOPS ELENGI*, L.—A lofty tree, not unfrequent in the tropical forests of Katchall.

267. *MIMUSOPS LITTORALIS*, Kurz in Peg. Rep. 1875. E. 34. in erratis.

Arbor vasta, sempervirens, glabra; folia obovata ad obovato-oblonga, petiolo gracili  $\frac{1}{2}$ —1 poll. suffulta, basi acuta,  $2\frac{1}{2}$ —4 poll. longa, obtusa et vulgo retusa, coriacea, glabra, supra nitentia; flores parvi, pedicellis robustis subglabris  $\frac{1}{2}$ — $\frac{3}{4}$  (sub fructu usque ad  $1\frac{1}{2}$ ) poll. longis suffulti, solitarii, axillares; calyx circ. 2 lin. longus, adpresse fulvo-puberulus et glabrescens, 6-lobus (an semper?), lobis ovatis obtusiusculis; corollæ lobi sepalis triplo numerosiores: lobi exteriores 12, lineari-lanceolati; interiores 6, erecti, breviores et angustiores, basi attenuati et filamentorum basibus subadnati; stamina 12, glabra, cum squamis minutis totidem denticulatis alternantia; antheræ acuminatæ; ovarium fulvo-pubescens; baccæ depresso-globosæ et fere pomiformes, 1— $1\frac{1}{2}$  poll. circiter in diametro, læves, vulgo 5-v. 6-loculares et -spermæ; semina compresso-oblonga, semipollicem circiter longa, hilo conspicuo subbasali obliquo.

Frequent in the forests of the rocky coast of Katchall, especially along the northern and eastern sides.

The bullet-wood grows here as luxuriantly as on the Andamans, where at Ross-island itself seven trees, survivors of the former forests, are still standing.

*EBENACEÆ.*

268. *DIOSPYROS KURZII*, Hiern.—Rare in the coral-reef-forests of Katchall; said to occur also in the tropical forests of Kamorta; Nankowry (Novara 147; Jelinek 146).

269. *DIOSPYROS UNDULATA*, Wall.—Nankowry (Novara 149; Jelinek 126—*oka ohe*, inc.).

270. *MABA ANDAMANICA*, (*Marcereightia Andamanica*, Kurz in And. Rep. 2nd ed. A. p. 42).

Frutex sempervirens, 3—5-pedalis, novellis ochraceo-hirsutis v. pubescentibus; folia elliptico-ad ovato-oblonga, petiolo brevissimo brunneo-tomentello suffulta, basi subcordata, abrupte acuminata v. apiculata, integra, 4—6 poll. longa, chartacea, supra glabra, subtus secus costam





nervosque adpresse fulvo-puberula, laxe reticulata; flores feminei tantum noti, 3-meri, axillares, sessiles, solitarii; calyx profunde 3-lobus, lobis acutis, parce pilosis; baccæ subsiccæ, elliptico-oblongæ v. oblongæ, plus quam pollice longæ, styloso-mucronatæ, læves, sæpius 3-spermæ; semina lineari-oblonga.—Tillangchong (Novara 148; Jelinek 105).

### STYRACACEÆ.

271. SYMPLOCOS LEIOSTACHYA, Kurz in Journ. As. Soc. Beng. 1873, 89 and in Trim. Journ. Bot. 1875, 329.—A lofty tree, common in the tropical forests of Kamorta, remaining low along the outskirts of the forests.

### JASMINACEÆ.

272. JASMINUM ACUMINATISSIMUM, Bl.—Frequent in the tropical forests of Kamorta, and along their outskirts; Nankowry (Novara 103 and 104; Jelinek 121 and 162—*njod*, inc.).

273. CHIONANTHUS PALEMBANICUS, Miq. Suppl. Fl. Sum. 558.—Great Nicobar (Novara 73; Jelinek 255—*utenya*, inc.); Nankowry (Novara 74; Jelinek 125—*klanghong*, inc.).

N. B. Fruiting specimens from the Vienna Museum prove the species to be quite distinct from *Ch. ramiflorus*, Roxb., with which I identified the flowering specimens from the Andamans in my And. Rep. App. A. 42. The drupes are 1—1½ inches long, ovoid to oblong, slightly curved, the putamen smooth or, more usually, slightly and longitudinally furrowed. Neither do I believe that Roxburgh's Moluccan species is correctly identified with the Indian plant of the same name and with *Ch. macrophyllus* (Linociera—Wall.).

274. CHIONANTHUS sp. ? (leaves only). Not unfrequent in the coral-reef-forests of Katchall; (Novara 57; Jelinek).

### APOCYNACEÆ.

275. CARISSA DIFFUSA, Roxb.—Karnicobar (g. c.).

276. STRYCHNOS ACUMINATA, Wall.—Nankowry (Novara 105; Jelinek 159—*schong*, inc.).

277. FAGRAEA RACEMOSA, Jack.—Frequent in the tropical forests of Kamorta, but still more common as a small tree on the grass-heaths of the same island; Great Nicobar (Novara 106; Jelinek 241—*iloko*, inc.).

278. GYNOPOGON STELLATUM, Labill.—Nankowry, at Malacca.

279. CERBERA ODALLUM, Ham.—Not unfrequent in the beach-forests, and along the outskirts of the mangrove-swamps, of Kamorta and Katchall.

280. OCHROSIA SALUBRIS, Miq.—Rather frequent in the beach-forests of Kamorta; Trice and Track (Novara 106/a; Jelinek 184—*bata*, inc.).





281. *TABERNÆMONTANA CRISPA*, Roxb., var. *NICOBARICA* (*T. Nicobarica*, Liebm. Ind. sem. Hort. Hanniensis et Linnæa XXVIII. 363), calycis lobis angustis subspathulatis tantum differt.—Common in the beach-forests of all the islands; Karnicobar (Kamphœvener; Novara 108 & 110; Jelinek 33 & 45—*togarata* or *takorota*, inc.); Trice and Track (Novara 109; Jelinek 182—*hlangnjei*, inc.); *galie naik*, inc. Katch.

282. *AGANOSMA ACUMINATA*, Don. (*A. euloba*, Miq.).—Karnicobar (g. c.).

283. *ALSTONIA SPECTABILIS*, R. Br.—Frequent in the coral-reef-forests of Katchall; (Jelinek—*tulano*, inc.).

284. *ALSTONIA MACROPHYLLA*, Roxb. and var.  $\beta$ . *ACUMINATA* (*A. acuminata*, Miq. Ann. Mus. Lugd. Bat. IV. 140), folia glaberrima, petiol breviores.—Both varieties with intermediate forms frequent in the tropical forests of Kamorta; Karnicobar (Novara 107; Jelinek 14).

285. *PARSONSIA SPIRALIS*, R. Br. (*Heligme Javanica*, Bl.).—Frequent in the tropical forests of Katchall; Karnicobar (Novara 111; Jelinek 82—*tehen*, inc.).

286. *ANODENDRON PANICULATUM*, DC.—Frequent in the beach and tropical forests of Kamorta.

N. B. This, as Mr. Homfray of Port Blair has pointed out to me, is the plant which furnishes the strong fibre used by the Andamanese for their bow-strings.

### ASOLEPIADEÆ.

287. *SARCOLOBUS GLOBOSUS*, Wall.—Great Nicobar, in mangrove-swamps (Novara 112; Jelinek 249—*intijok*, inc.).

288. *CYNOCTONUM WALLICHII*, Dene.—Kamorta, in shrubbery near the old cattle-shed on the grass-heaths.

289. *BIDARIA* sp.? Fruiting specimens only.—Great Nicobar (Novara 114; Jelinek 232—*ekowische*, inc.).—Much resembles *B. tingens*, Dene., but has the leaves much larger and the pods 6—8 in. long and narrowed into a stalk.

290. *WATTAKAKA VIRIDIFLORA*, Hassk.—Nicobars (*teste* D.).

291. *DISCHIDIA NUMMULARIA*, R. Br.—Rather frequent on trees, chiefly in the beach-forests, but also on the grass-heaths of Kamorta and Katchall.

292. *DISCHIDIA BENGALENSIS*, Coleb.—Common on trees, especially cocoa-nut trees, of the beach-forests of Kamorta and Katchall; (Novara 115; Jelinek).

293. *HOYA HOOKERI*, Wight.—Frequent on trees of the beach and tidal forests of Kamorta and Katchall; (Novara 113; Jelinek).





CONVOLVULACEÆ.

294. *IPOMŒA VITIFOLIA*, Sw.—Common in the tropical forests of Kamorta ; Nankowry (Novara 127 ; Jelinek 163) ; Great Nicobar (Novara 128 ; Jelinek 230—*nakatal*, inc.).

295. *IPOMŒA NICOBARICA*, nov. sp.

Alte volubilis, perennis, glabra, ramulis subangulatis ; folia e basi profunde sinuato-cordata lato-ovata, petiolo 1—3½ pollicari suffulta, obtusa et sæpius cum mucrone, integra, 1½—3 poll. lata et longa v. paullo longiora, membranacea, glabra, subtus pallidiora et obscurius venosa ; flores majusculi, candidi, pedicellis strictis sursum subcrassioribus glabris suffulti et 2—3-ni, rarius solitarii, pedunculum brevissimum (vix 3—4 lin. longum) axillarem terminantes ; calycis lobi 3½—4 lin. longi, lato-elliptici, obtusissimi, mucronati, scariosi, glabri, interiores latiores et obtusiores ; corolla infundibuliformis, glabra, 1½ poll. longa, lobis lato-subcordatis mucronatis ; capsulæ chartaceæ, depresso-globosæ, glabræ, pedicello elongato ¾—1-pollicari et parum incrassato suffultæ ; semina subglobosa, 1½ lin. crassa, atra, lævia.—Ex affinitate *I. cymosæ*.

The leaves much resemble those of *I. obscura* or *I. denticulata*, but are much larger. Rather frequent in the more open parts of the tropical forests of Kamorta.

296. *IPOMŒA SEPIARIA*, Koen.—Karnicobar (Novara 133 ; Jelinek 26—*manyi*, inc.).—A form with narrower, almost sagittate and angular leaves.

297. *IPOMŒA DENTICULATA*, Choisy.—Common in the beach-forests and along the sandy shores of Kamorta and Katchall ; Great Nicobar (g. c.).

298. *IPOMŒA CAMPANULATA*, L.—Not unfrequent amongst shrubbery in the beach-jungles of Kamorta ; Pulu Milu (Novara 132 ; Jelinek 212—*minjab*, inc.).

299. *IPOMŒA TURPETHUM*, R. Br.—Not unfrequent in shrubbery of the beach-forests of Katchall ; (Novara 129 ; Jelinek).

300. *IPOMŒA PES-CAPRE*, Sw.—Common along the beaches and in the beach-forests of all the islands ; Karnicobar (Novara 131 ; Jelinek 37—*lanankap*, inc.).

301. *IPOMŒA LINIFOLIA*, Bl.—Frequent amongst grass, along rivulets, on the grass-heaths of Kamorta.

N. B. Dr. Diedrichsen enumerates also *Lepistemon*, *Calonyction*, and *Aniseia* in his list of Nicobarese plants.

302. *EVOLVULUS LINIFOLIUS*, L. (with white flowers).—Locally on the grass-heaths of Kamorta.

303. *ERYCIBE PANICULATA*, Roxb. var.—A large climber, frequent in the tropical forests of Kamorta ; Karnicobar (g. c.).





*BIGNONIACEÆ.*

304. *RADERMACHERA LOBBII*, Miq.—A large tree up to 80 feet high, common in the tropical forests of Kamorta.

305. *SPATHODEA RHEEDII*, Wall.—Katchall (g. c.).

*ACANTHACEÆ.*

306. *THUNBERGIA* sp.—Nicobars (*teste* D.).

307. *ACANTHUS ILICIFOLIUS*, L.—Along tidal marshes, Kamorta.

308. *EBERMAYERA LANCEOLATA*, Hassk.—Great Nicobar (g. c.).

309. *HEMIOGRAPHIS GLANDULOSA*, T. And.—In open or cleared spots in the coral-reef-forests of Katchall; Karnicobar (Novara 139; Jelinek 31—*samtarod*, inc.).

310. *HYGROPHILA SALICIFOLIA*, NE.—Not unfrequent along rivulets in the grass-heaths of Kamorta.

311. *PERISTROPHE ACUMINATA*, NE.—Here and there in the coral-reef-forests of Katchall; Great Nicobar (g. c.).

312. *DÆDALACANTHUS SUFFRUTICOSUS*, T. And.—Karnicobar (g. c.).

313. *ERANTHEMUM SUCCIFOLIUM*, nov. sp.

Herba annua, succulenta, glabra, 1—2½-pedalis, caule viridi v. fusciscente (nunquam albo); folia lanceolata ad elliptico-lanceolata, basi acuta, petiolo usque pollicari crasso suffulta, obtuse v. acutiuscule acuminata, 4—8 poll. longa, succulento-coriacea, glaberrima, nitida, in sicco fusciscentia; flores speciosi, candidi, pedicellis 1—2 lin. longis puberulis suffulti, 2—3-ni v. raro per plures fasciculati et secundi, bracteis linearibus pedicellos æquantibus v. brevioribus sustenti et paniculam vulgo amplam rarius contractam brachiatam minute puberulam terminalem efformantes; calycis lacinie subulatæ, 3 lin. longæ; corollæ tubus 1—1½ poll. longus, limbus subbilabiatus, lobi inferiores 3 lato-obovati subacuti, basi usque ad quartam partem longitudinis connati, lobi superiores 2 oblongi, acutiusculi, basi usque ad ½ partem connati; capsulæ clavatæ in partem sterilem fere semipollicarem attenuatæ, normaliter 4-spermæ; semina compressa, orbiculari-reniformia, glabra, rugosissima.—Ex affinitate *E. Blumei*.

Common in the beach-forests of Kamorta and Katchall; Great Nicobar (g. c.); Karnicobar (Novara 141; Jelinek 78—*okpakue* inc.).

314. *ERANTHEMUM ALBUM*, T. And.?—Karnicobar and Katchall (g. c.).

315. *JUSTICIA VASCULOSA*, Wall.—Katchall; Trice and Track, and Great Nicobar (g. c.).

316. *JUSTICIA SUMATRANA* (*Gendarussa?* *Sumatrana*, Miq. Fl. Ind. Bat. II. 832.)—Frequent in the tropical forests (calcareous) of the eastern coast of Katchall. The corolla is uniformly white.





*PEDALINEÆ.*

- \*317. *SESAMUM INDICUM*, DC.—Nankowry, at Malacca; cultivated?

*CYRTANDRACEÆ.*

318. *EPITHEMA CARNOSUM*, DC. var.—On shady coral-rocks in the tropical forests of the eastern coast of Katchall, rare.

319. *CYRTANDRA* sp. ? (leaves only).—Katchall (g. c.).

N. B. *Cyrtandra acuminata*, Wall. in Trim. Journ. Bot. 1875, 329, requires comparison with *Cyrtandromæa decurrens*, Zoll. Syst. Verz. part 3. 58—a species unknown to me.

*LENTIBULARIÆ.*

320. *UTRICULARIA DIANTHA*, Roem. and Schult.—In a rivulet on the grass-heaths east of Enaca, Kamorta.

*SCROPHULARINEÆ.*

321. *SCOPARIA DULCIS*, L.—A common weed in the beach-forests and on cleared lands, around the huts of the natives, etc., in Kamorta and Katchall.

322. *TORENIA CORDIFOLIA*, Roxb.—In shrubberies in cleared or open places, especially along road-sides, in the tropical forests near the penal settlement at Kamorta.

323. *BONNAYA* sp.—Nicobars (*teste* D.).

324. *LIMNOPHILA HIRSUTA*, Bth., var. *SCABERRIMA*. Folia rugosa, supra tuberculis hyalino-albidis calcareis et setulis boragineo-scaberrima, subtus punctata et hirsuta.

Rather frequent along swampy rivulets on the grass-heaths of Kamorta.

325. *ADENOSMA HIRSUTUM* (*Pterostigma hirsutum*, Bth.), var. *bracteis longioribus*.—Rare and but local on the grass-heaths of Kamorta.

326. *STRIGA HIRSUTA*, Bth. (with yellow flowers).—Rare and sporadic on the grass-heaths of Kamorta.

327. *CENTRANTHERA HISPIDA*, R. Br.—Only one specimen met with on the grass-heaths of Kamorta.

*VERBENACEÆ.*

328. *VITEX NEGUNDO*, L.—Rather frequent in the beach-forests of Kamorta and Katchall, also found occasionally on the grass-heaths of Kamorta; Pulu Milu (Novara 121; Jelinek—*hita*, inc.).

329. *STACHYTARPHA INDICA*, Vhl.—Frequent in grass-land and shrubbery around the penal settlement on Kamorta.

330. *PREMNA INTEGRIFOLIA*, L.—Frequent in the beach-forests of Kamorta and Katchall; Karnicobar (g. c.); *tanyól*, inc. Katch.



N. B. *Sphænodesma eryciboides*, Kurz in Journ. As. Soc. Beng. 1871, 76, = *Symphorema grossa* (*Premna* ? *grossa*, Wall. Cat. 1874; DC. Prodr. XI. 638). *Sphenodesma* and *Symphorema* are in my opinion not generically distinct.

331. *CLERODENDRON INERME*, L.—In the beach and tidal forests of Kamorta; Karnicobar (Novara 118; Jelinek 25—*manjudjon*, inc.).

332. *CLERODENDRON PANICULATUM*, L.—Nicobars (Novara 117; Jelinek).

333. *CALLICARPA LONGIFOLIA*, Lamk.—Common in the beach-jungles of all the islands; Karnicobar (Novara 119; Jelinek 51—*kimvidang*, inc.); Nankowry (Novara 120; Jelinek 117—*kalafat*, inc.).

334. *GMELINA ASIATICA*, L.—Rather frequent near the old cattle-shed on the grass-heaths north of the penal settlement of Kamorta; probably only an intruder from the tropical forests, where it ought to be found.

#### BORAGINEÆ.

335. *EHRETIA* sp.—Nicobars (*teste* D.).

336. *CORDIA SUBCORDATA*, Lamk.—A large shrub along the sea-shore, especially along beaches, of the eastern coast of Kamorta; Nankowry, (Novara 122; Jelinek 122—*njod*, inc.).

337. *TOURNEFORTIA ARGENTEA*, L.—Common in the beach-forests, especially along the sea-border itself, of Katchall; Trice and Traek (g. c.); (Novara 124; Jelinek).

338. *TOURNEFORTIA GLABRA* (*Tetrandra glabra*, Miq.).—Scandent, in patches of low jungle along one of the rivulets in the grass-heaths of Kamorta; Katchall (g. c.).

#### LABIATÆ.

339. *OCYMUM SANCTUM*, L.—Frequent around the huts of the natives in the beach-forests of Kamorta and Katchall; Nankowry (Novara 116; Jelinek 110—*tshamenga*, inc.).

340. *DYSOPHYLLA AURICULARIA*, Bth.—In a swampy rivulet on the grass-heaths west of Enaca, Kamorta.

\*341. *HYPTIS SUAVEOLENS*, Poir.—As wild around the huts of the natives at Malacca, Nankowry.

Diedrichsen mentions *Orthosiphon* also as a Nicobarese plant.

342. *LEUCAS* sp.—Nicobars (*teste* D.).

#### NYCTAGINEÆ.

343. *BOERHAAVIA GLUTINOSA*, Vhl.—Nicobars (*teste* Vahl.).



### AMARANTACEÆ.

344. *AMARANTUS VIRIDIS*, L.—Not unfrequent around the huts of the natives in the beach-forests of Katchall and Kamorta; *aygóbó*, inc. Katch.

345. *AMARANTUS GANGETICUS*, L.—Around the huts of the natives in the beach-forests of Katchall.

346. *AERVA LANATA*, Juss.—Frequent in the beach-forests of Katchall; *dyu-al*, inc. Katch.

347. *ALTERNANTHERA* sp.—Nicobars (*teste* D.).

348. *ACHYRANTHES ASPERA*, L.—Nicobars (Novara 67; Jelinek).

349. *CYATHULA PROSTRATA*, Bl.—Great Nicobar (Novara 68; Jelinek 215—*teünji*, inc.).

350. *DESMOCHAETA* sp.—Nicobars (*teste* D.).

### POLYGONEÆ.

351. *POLYGONUM FLACCIDUM*, Roxb.—In a jungle-marsh in the coral-reef-forests behind Katjui, on the western coast of Katchall.

### MONIMIACEÆ.

352. *KIBARA CORIACEA*, Hf. & Th.—Great Nicobar (Novara 69; Jelinek 270).

### LAURINEÆ.

353. *CINNAMOMUM OBTUSIFOLIUM*, N. E.—Not unfrequent in the tropical forests of Kamorta; Nankowry (Novara 71; Jelinek 144—*montam*, inc.).

354. *CRYPTOCARYA FERREA*, Bl.—Rather rare in the tropical forests of Kamorta.

N. B. Diedrichsen gives *Polyadenia* also as Nicobarese.

355. *TETRANTHERA LAURIFOLIA*, Jacq.—Pulu Milu (Novara 70; Jelinek 210—*bogiak*, inc.); Great Nicobar (g. c.).

356. *TETRANTHERA AMARA* NE., var.  $\gamma$ . *ANDAMANICA* (v. sp. propria?), folia multo majora et tenuiora; umbellæ numerosæ, pedunculis gracilibus usque ad 4 lin. longis suffultæ.—Karnicobar (Novara 72; Jelinek 35—*takawoka*, inc.).

357. *LITSÆA FOLIOSA*, NE.—Common in the tropical forests of Kamorta; Nankowry (Novara 76; Jelinek 137—*ulenja*, inc.).

358. *CASSYTHA FILIFORMIS*, L.—Common in the beach-forests of Kamorta and Katchall; Karnicobar (Novara 79; Jelinek 60—*kumbraga*, inc.).

359. *HERNANDIA PELTATA*, Meissn.—Common in the beach-forests of Kamorta and Katchall; Karnicobar (Novara 80; Jelinek 40—*minhud*).





146 S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands*. [No. 3,

*LORANTHACEÆ.*

360. *LORANTHUS* sp.—Nicobars (*teste* D.).

*SANTALACEÆ.*

361. *HENSLOWIA ERYTHROCARPA*, Kurz in Trim. Journ. Bot. 1875, 329.—Rare in the tropical forests of Kamorta.

*ELÆAGNACEÆ.*

362. *ELÆAGNUS ARBOREA*, Roxb.—In shrubbery along the tropical forests of Kamorta; Nankowry (Novara 81; Jelinek 164—*klumhang*, inc.).

*THYMELÆACEÆ.*

363. *GONYSTYLUS MIQUELIANUS*, T. et B.—Rare in the tropical forests of Kamorta.

*ARISTOLOCHIACEÆ.*

364. *BRAGANTIA TOMENTOSA*, R. Br.—Katchall and Trice and Track (g. c.); Great Nicobar (Novara 82; Jelinek 223—*taman*, inc.).

N. B. Diedrichsen mentions *Aristolochia* also.

*MYRISTICACEÆ.*

365. *MYRISTICA CORTICOSA*, Hf. and Th.—Not unfrequent in the tropical forests of Kamorta.

*EUPHORBIACEÆ.*

366. *ACTEPHILA JAVANICA*, Miq.—Katchall (g. c.).

367. *ACTEPHILA PUBERULA*, Kurz in Journ. As. Soc. Beng. 1873, 236.—Common in the tropical and the coral-reef-forests of Katchall; Til-langchong (Novara 199 and 192; Jelinek 100).

368. *GLOCHIDION CALOCARPUM*, Kurz in Trim. Journ. Bot. 1875, 330.—Common in the beach and coral-reef-forests of Kamorta and Katchall; Karnicobar (Novara 204; Jelinek 50—*kinfidn*, inc.); Great Nicobar (g. c.).

369. *PHYLLANTHUS NIRURI*, L.—A weed around the huts of the natives in the beach-forests of Katchall.

370. *BREYNIA OBLONGIFOLIA*, Muell. Arg. (var. *foliis majoribus*). A small tree in the coral-reef-forests of Katchall.

371. *BREYNIA RACEMOSA*, Muell. Arg.—Not unfrequent in the beach and coral-reef-forests of Katchall; Great Nicobar (Novara 196; Jelinek 228—*henonguiwe*, inc.).

372. *BREYNIA RHAMNOIDES*, Muell. Arg.—Nankowry (Novara 205; Jelinek 161—*matmeijong*, inc.).





1876.] S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands.* 147

N. B. Diedrichsen enumerates *Cicca* in his list of Nicobarese genera.

373. *SECURINEGA OBOVATA*, Muell. Arg.—Not unfrequent in the beach and coral-reef-forests of Kamorta and Katchall, rarely entering the tropical forests; Karnicobar (Novara 193; Jelinek 43—*hengot*, inc.).

374. *ANTIDESMA MENASU*, Muell. Arg.—Karnicobar (Novara 66; Jelinek 54—*senepkomó*, inc.).

375. *ANTIDESMA PUNCTICULATUM*, Miq.—Not unfrequent in the tropical forests of Kamorta.

376. *ANTIDESMA PERSIMILIS*, Kurz in Trim. Journ. Bot. 1875, 330.—Not unfrequent in the tropical forests of Kamorta.

377. *ANTIDESMA GHESEMBILLA*, Gaertn.—Common on the grass-heaths of Kamorta.

378. *APOROSA GLABRIFOLIA*, Kurz in Trim. Journ. Bot. 1875, 330. Common on the grass-heaths of Kamorta.

379. *APOROSA MICROSTACHYA*, Muell. Arg.—Rather frequent in the tropical forests of Kamorta; Great Nicobar (Novara 212; Jelinek 262—*lamacha*, inc.).

380. *BACCAUREA JAVANICA*, Muell. Arg. (*B. acuminata*, Muell. Arg.).—A tree 60 feet high by 8—10 feet in girth, on Nankowry (Novara 213; Jelinek 167—*lanob*, inc.).

N. B. *Adenocrepis Javanica*, Bl., and *Microsepala acuminata*, Miq., are in my opinion the same plant, but Miquel named some specimens from the Lampongs (Herb. Bog. No. 4531) also by the latter name. These differ greatly by the very short racemes and by the leaves drying yellow like those of a *Symplocos*.

381. *CYCLOSTEMON LEIOCARPUM*, Kurz in Trim. Journ. Bot. 1875, 330.—Here and there in the tropical forests of Kamorta.

382. *BRIEDELIA GLAUCA*, Bl.—Not unfrequent in the beach-forests of Kamorta and Katchall; (Novara 195, Jelinek).

383. *BRIEDELIA TOMENTOSA*, Bl.—Rather frequent along the outskirts of the tropical forests of Kamorta; Katchall (g. c.).

384. *CROTON ARGYRATUM*, Bl.—Not unfrequent in the tropical forests of Kamorta.

385. *MALLOTUS ACUMINATUS*, Muell. Arg.—Common in the coral-reef-forests of Katchall; Great Nicobar (Novara 200; Jelinek 221 & 217—*ungakab*, inc.).

386. *MALLOTUS HELPERI*, Muell. Arg.—Trice, Track, or Meroe (g. c.).

387. *MALLOTUS MURICATUS*, Muell. Arg.—Frequent in the coral-reef-forests of Katchall; Kamorta (g. c.).

388. *MACARANGA TANABIUS*, Muell. Arg. (*M. molliuscula*, Kurz in Journ. As. Soc. Beng. 1873. 245).—Frequent in the beach-forests of Kamorta and Katchall; Nankowry (Novara 197; Jelinek 150—*kendub*, inc.); *kángyua*, inc. Katch.





389. *MACARANGA GIGANTEA*, Muell. Arg.—Common in the tropical forests of Kamorta.

390. *ALCHORNEA JAVENSIS*, Muell. Arg.—Common in the coral-reef-forests of Katchall; Karnicobar (Novara 202; Jelinek 52—*kamfata*, inc.).

391. *ALCHORNEA TILIEFOLIA*, Muell. Arg.—Karnicobar (g. c.).

N. B. Diedrichsen gives *Acalypha* as a Nicobarese plant.

392. *CHEILOSA MONTANA*, Bl. var.—Nankowry (Novara 164; Jelinek 175—*majab*).

393. *RICINUS COMMUNIS*, L.—Frequent and like wild in the beach-forests of Kamorta and Katchall, entering also the coral-reef-forests; Great Nicobar (Jelinek—*ma*, inc.); *máh*, inc. Katch.

\*394. *MANIHOT UTILISSIMA*, Pohl.—Nicobars (*teste* D.).

395. *GELONIUM LANCEOLATUM*, Willd.—In the coral-reef-forests of Katchall; Karnicobar (Novara 207; Jelinek 12—*liussoldova*, inc.).

396. *GELONIUM BIPARIUM*, Roxb.—Karnicobar (Novara 206 & 208; Jelinek 12—*liussoldova*, inc.).

397. *CLAOXYLON LONGIFOLIUM*, Muell. Arg.—A small tree not unfrequent in the tropical and beach-forests of Kamorta and Katchall; *lanú án*, inc. Katch.

398. *CLAOXYLON MOLLE*, Endl.—Frequent in the beach-forests of Kamorta and Katchall, entering the tropical forests; Nankowry (Novara 203; Jelinek 149—*enghoye*, inc.).

399. *EXCÆCARIA AGALLOCHA*, L.—Frequent in the tidal and beach-forests of Kamorta.

400. *EXCÆCARIA OPPOSITIFOLIA*, Jacq.—Great Nicobar (Novara 194; Jelinek 246—*fugh*, inc.).

401. *EXCÆCARIA RECTINERVIS* (*Actephila rectinervis*, Kurz in Trim. Journ. Bot. 1875. 329).

Descriptioni (l. c.) adde: folia integerrima, obtusissima v. retusa, rarius apiculata; flores masculi sessiles, diandri, solitarii in axillis bractearum obcordatarum et in spicam sessilem glabram petiolo breviorum aggregati; spicæ omnino masculæ v. basi 2—3 floribus feminibus brevissime pedicellatis auctæ; ovarium trigono-ovatum, glabrum, stylis 3 crassis reflexis coronatum; capsulæ maturæ pedunculo glabro c. semipollinari suffultæ, globoso-trigonæ, cerasi magni magnitudine, crustacæ, læves; semina subglobosa, pisi minoris magnitudine, pallida, ferrugineo-tigrina et maculata.—Speciei precedenti affinis.

Common on coral-rocks in the tropical forests of Katchall; Tilangchong (Novara 192 & 199; Jelinek 100).

402. *EUPHORBIA PARVIFLORA*, L., var. *LINEARIFOLIA*.—Here and there on the grass-heaths of Kamorta.

403. *EUPHORBIA ATOTA*, Forst.—Common on the beaches and in the





beach-forests of the western coast of Katchall; Great Nicobar (g. c.); Karnicobar (Novara 191; Jelinek 86—*mupee*).

404. *EUPHORBIA PILULIFERA*, L.—A weed around habitations in the beach-forests and uncultivated parts of Kamorta and Katchall.

405. *EUPHORBIA EPIPHYLLOIDES*, Kurz in Journ. As. Soc. Beng. 1873, 247.—Karnicobar and Great Nicobar (g. c.).

### URTICACEÆ.

406. *ELATOSTEMA NOVARÆ*, nov. sp.

Fruticulosa, ramosa, glabra; folia alterna, oblique lanceolata v. ovato-lanceolata, basi inæquilaterali acuta, triplinervia, subsessilia, subulato-acuminata, repando-serrata, membranacea, nigrescentia, 3—6 poll. longa, glabra, striis linearibus sparsis adpressis obducta, nervis lateralibus non procul a margine ipso confluentibus; stipulæ subulatæ, 2—3 lin. longæ, deciduæ; flores subglabri, iis *E. lineolati* similes, in axillis foliorum glomerati.—Nankowry (Novara 63; Jelinek 169).

Near *E. lineolatum*, but differs at once by the nigrescent leaves, different nervation, and smaller flowers and flower-clusters.

407. *ELATOSTEMA INTEGRIFOLIUM*, Wedd.—Katchall (g. c.).

408. *PELLIONIA PROCRIDIFOLIA*, Kurz in Trim. Journ. Bot. 1875, 330.—Rather frequent in the coral-reef-forests of Katchall.—Very near to *P. frutescens*, which is a hill-species and has serrate leaves.

409. *VILLEBRUNNEA SYLVATICA*, Bl.—Not unfrequent in the tropical forests of Kamorta.

410. *PIPTURUS VELUTINUS*, Wedd.—Trice and Track (Novara 65; Jelinek 183—*njiha*, inc.); Nankowry (Novara 64; Jelinek 154—*kenpei-hriné*, inc.).

N. B. Diedrichsen enumerates *Boehmeria* also.

411. *GONOSTEGIA HIRTA*, Miq.—Rather frequent along swampy rivulets on the grass-heaths of Kamorta.

412. *POUZOLZIA INDICA*, Gaud.—Not unfrequent along swampy rivulets on the grass-heaths of Kamorta.

N. B. *Parietaria* of Diedrichsen's list will probably be the above.

413. *CONOCEPHALUS* sp.—Nicobars (*teste* D.).

\*414. *ARTOCARPUS INCISA*, L.—Cultivated on Karnicobar.

415. *ARTOCARPUS INTEGRIFOLIA*, L.—Cultivated; and I met with a batch of really wild trees in the tropical forest north of the settlement on Kamorta.

416. *ARTOCARPUS POMIFORMIS*, T. et B. in Nat. Tydschr. Ned. Ind. XXIV. 306.—Rather frequent in the coral-reef- and tropical forests of Kamorta and Katchall.

417. *ARTOCARPUS PEDUNCULARIS*, Kurz in Trim. Journ. Bot. 1875, 331.—Rather frequent but dispersed in the tropical forests of Kamorta.





418. *ARTOCARPUS CHAPLASHA*, Roxb.—Nankowry (Novara 60; Jelinek 165—*pajal*, inc.).

419. *FICUS RETUSA*, L.—Common in the coral-reef- and tropical forests of Kamorta and Katchall; Trice and Track (g. c.); Karnicobar (Novara 52; Jelinek 21—*keljue*, inc.); Nankowry and Pulu Milu (Novara 62 and 51; Jelinek 124 and 205—*pong*, inc.); *bong*, inc. Katch.

420. *FICUS INDICA*, L.—Not unfrequent in the tropical and coral-reef-forests of Kamorta and Katchall.

421. *FICUS INFECTORIA*, L.—Katchall (g. c.).

422. *FICUS RUMPHII*, Bl.—In the tropical forests (calcareous) of the eastern coast of Katchall; Great Nicobar (Novara 59; Jelinek 268).

423. *FICUS GIBBOSA*, Bl.—Frequent in the tropical forests of Kamorta; Karnicobar (Novara 61; Jelinek 53—*tajimiyi*, inc.).

424. *FICUS CHRYSOCARPA*, Rwdt.—In the tropical forests of Kamorta, rather rare.

425. *FICUS HISPIDA*, L. f.—Common in the beach-forests, rare in the coral-reef-forests, of Katchall and Kamorta; Karnicobar (Novara 58; Jelinek 44—*hambam*, inc.).

426. *FICUS PEDUNCULATA*, Rwdt.—A large tree on Nankowry (Novara 53; Jelinek 167—*lanob*, inc.).

427. *FICUS MACROPODA*, Kurz in Pegu Rep. A. 123 and B. 86.—Karnicobar (Novara 54; Jelinek 68—*tessamoa*, inc.); Nankowry (Novara 56; Jelinek 142—*komipuë*, inc.); Great Nicobar, very common (Novara 55; Jelinek 227—*inguë*, inc.).

428. *STREBLUS ASPER*, Lour., var. *foliis magis minusve scabris*.—Katchall (g. c.), Karnicobar (Novara 201; Jelinek 34—*alang*, inc.).

429. *TREMA ORIENTALIS*, Bl., var. *VELUTINA* (*Sponia velutina*, Planch.). Not unfrequent in the forests of Kamorta.

430. *GIRONNIEA SUBÆQUALIS*, Planch.—Rather rare in the tropical forests of Kamorta.

#### PIPERACEÆ.

431. *CHAVICA MACROSTACHYA*, Miq. var. ?—On shady coral-rocks, frequent in the tropical forests of Katchall; (Novara 49; Jelinek).

432. *CHAVICA BETLE*, Miq.—Cultivated and as wild in the beach-forests of all the islands; (Novara 48; Jelinek).

#### CASUARINEÆ.

433. *CASUARINA EQUISETIFOLIA*, Forst.—Frequent along the coast and on the beaches of Kamorta and the western side of Katchall; enters the grass-heaths of Kamorta and Karnicobar (Novara 50; Jelinek 6—*mahará*, inc.).





*GNETACEÆ.*

434. *GNETUM GNEMON*, L., var. *MACROPHYLLA*, folia 5—7 poll. longa,  $3\frac{1}{2}$ — $4\frac{1}{2}$  poll. lata, carnosio-membranacea, laxius reticulata; spicæ androgynæ, simplices, robustiores.—A tree (35—40 + 10—15 +  $2\frac{1}{2}$ — $3\frac{1}{2}$ ) rather frequent in the tropical forests of Kamorta; Trice and Track (Novara 46—47; Jelinek 190—*hitoi*, inc.).—Very distinct in appearance from the true *gnemon*, but hardly specifically different.

435. *GNETUM MACROPODUM*, Kurz in Trim. Journ. Bot. 1875, 331. Very common in the tropical forests of Kamorta.

*CYCADEÆ.*

436. *CYCAS RUMPHII*, Miq.—Common in the beach-forests of Kamorta and Katchall; on Kamorta the tree is found on the very ridges in open places of the tropical forests; Karnicobar (Jelinek—*turile* or *tewile*, inc.).

*PALMÆ.*

437. *NIPA FRUTICANS*, Wurmb.—Nicobars (*teste* D.).

438. *COCOS NUCIFERA*, L.—Common in the beach-forests of all the islands, locally ascending calcareous ridges up to 200 feet elevation; *ujou*, inc. Katch.

439. *ARECA CATECHU*, L.—Wild in the tropical forests of Kamorta, and apparently also in the coral-reef-forests of Katchall; otherwise everywhere cultivated and like wild; (Novara 43; Jelinek).

440. *ARECA AUGUSTA*, Kurz in Trim. Journ. Bot. 1875, 170.—Common in the tropical forests of Kamorta, Trinkut, and Nankowry,

441. *ORANIA NICOBARICA*, Kurz in Trim. Journ. Bot. 1875. 331. t. 171.—Common in the tropical forests of Kamorta.

442. *ZALACCA* sp. sterile only.—An erect rattan, apparently of this genus, is frequent in the tropical forests of Katchall.

443. *KORTHALSIA SCAPHIGERA*, Mart.—Great Nicobar (Novara 40; Jelinek 244—*schamoa*, inc.).

444. *CALAMUS ANDAMANICUS*, Kurz in Journ. As. Soc. Beng. 1874, 211, t. 27—28.

Drupæ maturæ globoso-ovoides, cerasi minoris magnitudine, acumine brunneo-squamato terminatæ; squamæ trapezoides, crustaceæ, stramineæ, nitidæ, anguste brunneo-marginatæ, convexiusculæ, medio vix impressæ, in appendicem pallidam membranaceam ciliatam squamæ longitudine v. breviorē prolongatæ; semen ovoideo-semiteres, dorso parce at grosse lacunosum; albumen homogeneous.

The drupes described and figured by me (l. c.) turn out not to have been quite ripe, and hence it is that the seed is represented with the



markings of the scales. Fully ripe drupes present a very different appearance from the figures given, the scales being much exerted and developed and of a straw-colour, and the appendages turning quite pale-coloured.—Common in the tropical forests of Kamorta; Karnicobar (Novara 41—42; Jelinek—*maätje*, inc.).

445. *CALAMUS* sp.—Rare in the tropical forests of Kamorta.

It is a small species with green prickly sheaths and broad pinnæ. I possess only the female flowers and am therefore unwilling to describe it as a new species. There are several other species of *Calamus* on these islands, but they were out of flower or fruit.

### *PANDANEÆ.*

446. *PANDANUS LERAM*, Jones.—Common in the tropical and coral-reef-forests of all the islands, delighting chiefly in and along jungle-marshes; *ladong*, inc. Katch.

N. B. Habit and affinity of *P. dubius*, Spreng., but shorter stemmed and more branched; the stigmas are auricular-orbicular, as large as in *P. dubius*, sessile, and somewhat waved on the margins.

447. *PANDANUS ODORATISSIMUS*, L. f.—Frequent on the beaches and in the beach-forests of Kamorta and Katchall; on Kamorta it forms a principal feature on the grass-heaths.

N. B. Junghuhn (Java. I. 2nd germ. ed. 109 sqq.) has already remarked upon and illustrated the great variability in habit of the screw-pines. The form which grows along the beaches forms arboreous ascending shrubs, much branched and sending down quite a labyrinth of straight aerial roots; but the one which grows on the heaths is entirely different, being a small tree from 20 to 25 feet in height with a stout grey simple stem, which sends down short and thick aerial roots from the lowermost part only, while the crown is small, sparingly and shortly branched, and very dense. There are, besides, two varieties of these trees on the heaths, the one having the stigmas normal as in the littoral form and the drupes connate high up so as to effect a tessellated appearance, while the other variety has the drupes free for about one-fourth of their length from the top terminating in short erect points, on the inner face of which the linear-lanceolate stigmas are situated. The foliage in the one is darker green, but the male flowers of both varieties are exactly the same. Dr. Hance (in Trim. Journ. Bot. 1875, 68.) has remarked upon the variability of the stigmas in screw-pines, but overlooked that I had myself pointed out this fact (Journ. Bot. 1867. 99.) with the qualification that they vary without therefore giving up their essential value. The stigmas ought to be described from the ovaries or the young drupes but it is difficult to collect such; it is usually only after the syncarps have attained some size that they catch the eye.



1876.] S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands.* 153

The male organs appear to me to be of much higher value in grouping the species of *Pandanus*, but the time has not yet arrived when these organs shall be available of all or even of most of the species. *Pandanus helicopus* was correctly placed by me in the section *Ryckia*, as I find on re-examination of my material, and I have also since obtained the male spadices of it, which shew racemose anthers.

448. *FREYCINETIA INSIGNIS*, Bl.—In the tropical forests of Katchall and Kamorta (also Andamans).

449. *FREYCINETIA SCANDENS*, Gaud. ?—Common in the tropical and coral-reef-forests of Katchall and Kamorta; Pulu Milu (Novara 39; Jelinek 197—*jī*, inc.). It is very doubtful whether this is really the same as Gaudichaud's plant, and it is possible that it may be only the young state of the preceding species, although I met with no intermediate states.

### AROIDEÆ.

450. *HOMALONEMA AROMATICUM*, Schott.—Common in the tropical forests of Kamorta; Pulu Milu (Novara 34; Jelinek 201—*lamany*, inc.).

451. *CHAMECLADON OVATUM*, Schott ?—Great Nicobar (Novara 33; Jelinek 280).—Schott's description agrees with the Nicobar plant except in some minor points. I have seen no authentic specimens of the Singapore plant.

452. *AGLAONEMA SIMPLEX*, Bl.—Not unfrequent in the coral-reef- and tropical forests of Katchall and Kamorta; Pulu Milu (Novara 32; Jelinek 196—*lakoa*, inc.).

N. B. *Aglaonema palustris*, T. et B. in Tydsch. Nat. Ver. Ned. Ind. XXIV. 305, = *Aglaodorum Griffithii*, Schott.

453. *COLOCASIA VIROSA*, Kth.—Very plentiful, in company with *Nephrodium propinquum*, along a swampy rivulet on the grass-heaths of Kamorta.

\*454. *COLOCASIA ANTIQUORUM*, Schott.—Frequently cultivated by the Nicobarese.

455. *POTHOS SCANDENS*, L.—Common in all forests of all the islands; Great Nicobar (Novara 37 & 38; Jelinek 233—*tamab*, inc.).

456. *SCINDAPSUS PTEROPODUS*, T. et B. in Nat. Tydsch. Ned. Ind. XXV. 407.—Great Nicobar (Novara 35; Jelinek 276).

### LEMNACEÆ.

457. *LEMNA PAUCICOSTATA*, Hegelm.—Western side of Katchall, in a jungle-marsh behind Katjui.

### NAJADACEÆ.

458. *CYMODOCEA* sp. ?—Common around Katchall and forming submarine meadows on the coral-reefs at a depth of 2—4 fathoms.



N. B. Diedrichsen has *Zostera* in his list of Nicobar plants.

459. *HALOPHILA OVALIS*, Hf.—Rather frequent, along with other pelagic phanerogams, on the submarine coral-reefs around Katchall.

460. *ENHALUS ACOROIDES*, Stend.—Forming submarine meadows and attaining a length of 4 feet in the shallows around all the islands. Prefers especially debouchures of freshwater-rivers. On the coral-reefs of Katchall there occurs in masses what appears to be a small form of this species which has the leaves never above 6 inches long.

461. *NAJAS* sp.—In water-holes of the jungle-marshes behind Katchui, on the western coast of Katchall. (The specimens had been too much ransacked by pigs from the village to enable me to procure more than the tips of the plants).

462. *BLYXA ROXBURGHII*, Rich.—Here and there in the rivulets on the grass-heaths of Kamorta.

#### SCITAMINEÆ.

463. *ALPINIA PHŒNICEA*, Kamphœvener MS.—Nicobars (*teste* D.).

464. *AMOMUM* (*DYMCZEWICZKIA*) *FENZLII*, nov. sp., Plate XII.

Herba perennis, sobolifera, elata, 5—7 ped. alta, glaberrima; folia 2—3-pedalia, lineari-oblonga, subabrupte acuminata, basi inæquali in petiolum 3—4 lin. longum attenuata, glaberrima, subcoriacea; vaginæ ore valde productæ; flores pro genere minuseuli, inter squamas et squamulas glabras villosomarginatas sessiles et capitulum magnum lato-involucratum hemisphericum formantes; pedunculus usque semipedalis laxè et ample bracteatus; bracteæ oblongæ ad ovato-oblongæ,  $1\frac{1}{2}$ —2 poll. longæ, glabræ, rosellæ v. albidæ, vulgo villosociliatæ; bracteæ involucrantes lato-ovales, obtusissimæ, 1— $1\frac{1}{2}$  poll. longæ, pallide rosæ, glabræ, marginibus lanato-villosæ; calyx tubulosus, apice 3-fidus v. 2-fidus cum lobo altero latiori et bilobulato, extus parce adpresse sericeo-pilosus; corolla  $1\frac{1}{2}$  poll. longa, tubo semipollicari intus usque ad medium villosus extus parce pilosus; perigonii lobi pallide rosei, concavo-lineares, pollicem circiter longi, marginibus parcissime pilosi, rectiusculi, apice cucullato sæpius penicillati; labellum equilongum, extus basin versus parce sericeum, trapezoideo-ovatum, concavum et genitalia omnino includens, basi attenuatum, subtiliter radiato-nervosum, coccineum, marginibus niveum; anthera inappendiculata, apice emarginata, basi marginibus barbata; filamentum planum, intus villosum; stylus sursum parce pilosus et leviter incrassatus; stigma oblique capitatum; staminodia 2, oblique oblonga, carnosa, apice ciliolata et passim biloba; baccæ obovoideæ, pollicem circiter longæ, perigonii tubo coronatæ, hirsutulæ; semina obovoidea, atra, albo-arillata.—Frequent in the tropical forests of Kamorta.





*MARANTACEÆ.*

465. *MARANTA DICHOTOMA*, Wall (*M. grandis*, Miq. Suppl. Fl. Sum. 616).—Frequent in the shade of the tropical forests of Kamorta; Katchall (g. c.); Nankowry (Novara 30; Jelinek 152—*ofu*, inc.).

466. *CANNA* sp.—Nicobars (*teste* D.).

*MUSACEÆ.*

\*467. *MUSA SAPIENTUM*, L.—Cultivated at the Penal Settlement of Kamorta. Whether the variety of the plantain cultivated by the Nicobarese belong to this species or to *M. simiarum* I am unable to say.

468. *MUSA SIMIARUM*, Rumph. ?—The plants growing in the forests of Kamorta were out of flowers and hence are doubtfully referred to this species.

*ORCHIDEÆ.*

469. *OBERONIA* sp.—On trees of the tropical forests of Kamorta, not rare (specimens lost).

470. *DENDROBIUM ANCEPS*, Sw.—Common on trees in the mangrove- and beach-forests of Kamorta and Katchall.

471. *DENDROBIUM CRUMENATUM*, Sw.—Frequent on trees in the beach- and mangrove-forests.

472. *DENDROBIUM* sp.—On trees on the grass-heaths of Kamorta.—Flowers exactly like those of *D. crumenatum*, but the leaves short, rigidly coriaceous, horizontal or half-erect, and distichous. Probably only an erect variety produced by abundance of light.

473. *PHOLIDOTA IMBRICATA*, Sm.—Rare on trees in the tropical forests of Kamorta.

474. *PACHYSTOMA SENILE*, Reichb. f.—Very common on the grass-heaths of Kamorta and sometimes producing quite a rose-coloured tint over large tracts of them. The flowers are here all rose-coloured, while in Bengal they are as constantly white.

475. *EULOPHIA ANDAMANENSIS*, Rehb. f. in Flora 1872. 276.—Rare on dry places near the mangrove-swamps and also in the drier parts of the swamps themselves, along the western coast of Katchall.

476. *EULOPHIA GRAMINEA*, Ldl.—In patches dispersed over the grass-heaths of Kamorta.

477. *EULOPHIA DECIPIENS*, nov. sp., Pl. XIII, Figs. 8—12. Herbæ erectæ, tuberosæ, glaberrimæ, 2—3 ped. altæ; folia ignota, hysteroanthia; scapus erectus, simplex, albidus, squamis parvis lanceolatis internodiis multoties brevioribus vestitus, glaberrimus; flores majusculi, albi, glaberrimi, pedicellis gracilibus 3—4 lin. longis glabris suffulti et secundi, bracteis minutis 2 lin. circiter longis sustenti; perigonii phylla exteriora et interiora 2 superiora linearia, vix falcata, 5-nervia,  $\frac{1}{2}$  poll. longa, acuta, gla-



bra; labellum concavo-obovatum, basi in calcar lineam fere longum graciliter saccatum desinens, supra medio 3-lobatum, lobo medio multo majore obtuso et sæpius mucronulato, marginibus crispulum, nervis basi 5, sursum circiter 10—12, longitudinalibus percursum quarum 4—5 in lobum majorem excurrunt et in fibrillas carnosas numerosas excrescunt; columna gracilis, recta, latiuscula, sepalorum dimidium vix attingens.—Here and there socially on the grass-heaths of Kamorta.

The plant, and indeed the structure of the flowers themselves, so closely resembles *Pachystoma senile* that I considered it for a while to be a perfectly glabrous form of it (*P. senile* having the flowers and pedicels all minutely puberulous), but it has short bracts, and the pollinia assign it to *Eulophia*.

478. *CYRTOPERA FUSCA*, Wight?—A few plants only among long grass along a swampy rivulet west of Enaca, Kamorta.

479. *PHALENOPSIS CORNU-CERVI*, Bl. et Reichb. f.—Here and there on trees in the tropical forests of Kamorta.

480. *TRICHOGLOTTIS QUADRICORNUTA*, nov. sp., Pl. XIII, Figs. 1—7.

Multicaulis, epiphytica, glabra, caulibus pendulis vaginis sulcato-striatis obductis; folia alterna, disticha, lineari-lanceolata, basi torta attenuata, subsessilia, acuminata, coriacea, in sicco 13—14-nervia, 2—3½ poll. longa; flores majusculi, oppositifolii, flavi?, 2-ni v. raro 3—4-ni fasciculati, pedicellis arcuatis ½ poll. fere longis sustenti; perigonii phylla exteriora obovato-oblonga, obtusa, circ. ½ poll. longa, lateralia subfalcata; phylla interiora 2 superiora conformia sed angustiora; labellum valde arcuatim inflexum, supra basi inæqualiter 4-cornutum, cornubus 2 posticis lorum locum tenentibus lineam fere longis acutiusculis, 2 basilaribus duplo brevioribus, intra cornua callo concavo hirsutissimo auctum et in lobum reflexo-arcuatum crassum linearem subtus apicem versus unicallosum apice breviter bifido levem excurrent; calcar rectiusculum, obtusiusculum, lobo medio paullo longius; columna brevissima; pollinia 2, globosa, apice in semipollen parvum ellipsoideum in cavitate pollinis insidens separabilia.

Frequent in the tropical forests of Kamorta; (Novara 28; Jelinek).

481. *LUISIA* sp.—Frequent on trees in the beach-forests of Kamorta and Katchall. Leaves only.

482. *VANDA TERES*, Ldl.?—Karnicobar (g. c.). Leaves only.

483. *SACCOLABIUM OBLIQUUM*, Ldl.—Common in the coral-reef and tropical forests of Katchall and Kamorta; (Novara 29; Jelinek). Flowers small, yellow, the lip whitish.

484. *THRIXSPERMUM AMPLEXICAULE*, Rehb. f. in Flora 1868. 53. (*Aërides amplexicaule*, Ldl.).—Only a single plant met with amongst long grass and shrubbery along a swampy rivulet west of Enaca, Kamorta. (In Java it grows amongst shrubbery on dry grounds).





485. *CORYMBIS DISTICHA*, Ldl.—Rare in the tropical forests on the plutonic hills of Ho Ho, Kamorta. Trice and Track (g. c.).

N. B. Living specimens of from 15 to 18 other species of orchids were collected by me, but most of these were lost or otherwise made away with.

### *BROMELIACEÆ.*

486. *ANANAS SATIVUS*, Schult.—Cultivated on the islands and producing superior fruits.

### *AMARYLLIDÆÆ.*

487. *CRINUM ASIATICUM*, L.—Common in the beach-forests of Kamorta and Katchall; Karnicobar (Novara 27; Jelinek 87—*faa*, inc.).

488. *HYPOXIS ORCHIOIDES*, Kurz in Miq. Ann. Mus. Lugd. Bat. IV. 177.—(*Curculigo ensifolia*, R. Br. Prod. 290; Bth. Fl. Austr. VI. 448).—Only a single specimen seen on the grass-heaths of Kamorta.

489. *MOLINERIA CAPITULATA*, Herb. Amaryll. 84 (*Leucojum capitulatum*, Lour. Fl. Coch. 246; *Molineria recurcata*, Herb. Amar. 84; Kurz in Miq. An. Mus. Lugd. Bat. IV. 175).—Nankowry (Novara 31; Jelinek 171—*tetokom*, inc.).

### *DIOSCOREACEÆ.*

490. *DIOSCOREA GLABRA*, Roxb.—Frequent in the tropical forests of Kamorta; Great Nicobar (Novara 26; Jelinek 231—*wuën*, inc.).

### *LILIACEÆ.*

491. *DRACENA ANGUSTIFOLIA*, Roxb.—Great Nicobar and Trice and Track (g. c.).

492. *DRACENA LINEARIFOLIA*, Miq. (*D. Finlaysoni*, Baker in Journ. Linn. Soc. XIV. 525).—Very common in all the forests, but more so in the beach- and coral-reef-forests, of Kamorta and Katchall; (Novara 25; Jelinek); *na-el*, inc. Katch.

493. *DRACENA GRIFFITHII*, Reg.—A tree 20 ft. high, rather rare in the tropical forests of Kamorta.

494. *DRACENA SPICATA*, Roxb.—Kondil and Karnicobar (g. c.).

495. *SMILAX POLYACANTHA*, Wall.—Common in the tropical forests of Kamorta.

496. *FLAGELLARIA INDICA*, L.—Common in the beach- and tidal forests of all the islands; Great Nicobar (Novara 24; Jelinek 242—*palāi*, inc.).

### *MELANTHACEÆ.*

497. *STEMONA* sp. (ROXBURGHIA).—Nicobars (*teste* D.).





*COMMELYNACEÆ.*

498. *ANEILEMA ENSIFOLIUM*, Wight.—Here and there, especially along swampy rivulets, on the grass-heaths of Kamorta, more frequent in the northern parts.

499. *ANEILEMA NUDIFLORUM*, R. Br.—Amongst grass along a rivulet on the grass-heaths of Kamorta.

500. *COMMELYN COMMUNIS*, L.—Frequent in the beach-forests of Kamorta, also in shrubbery near the old cattle-shed of the settlement on Kamorta.

N. B. Dr. Diedrichsen enumerates *Tradescantia*.

*RESTIACEÆ.*

501. *ERIOCAULON LONGIFOLIUM*, NE.—Not unfrequent along swampy rivulets of the grass-heaths of Kamorta.

502. *ERIOCAULON TRUNCATUM*, Ham.—Along a marshy rivulet on the grass-heaths of Kamorta.

*CYPERACEÆ.*

503. *KYLLINGIA MONOCEPHALA*, Rottb.—Frequent everywhere, in the forests as well as in cultivated lands, around habitations, etc.; Great Nicobar (Novara 18; Jelinek 216—*kons (ch) ea*, inc.).

504. *REMIREA MARITIMA*, Aubl.—Locally on the beaches of Kamorta.

505. *CYPERUS POLYSTACHYUS*, Roxb. and the variety *C. strictus*, Roxb.—Both pretty frequent on the grass-heaths of Kamorta.

506. *CYPERUS VULGARIS*, Kth.—Here and there along the swampy rivulets on the grass-heaths of Kamorta.

507. *CYPERUS HASPAN*, L.—Not unfrequent along marshy rivulets on the grass-heaths of Kamorta.

508. *CYPERUS IRIA*, L.—Locally along swampy rivulets on the grass-heaths of Kamorta.

509. *CYPERUS MÆSTUS*, NE.—Not unfrequent in the tropical and coral-reef-forests of Kamorta and Katchall.

510. *CYPERUS PILOSUS*, Vhl.—Here and there along swampy rivulets on the grass-heaths of Kamorta.

511. *CYPERUS CANESCENS*, Vhl.—Nicobars (Novara 22 and 23; Jelinek and Hochstetter).

512. *CYPERUS DILUTUS*, Vhl.—Rather frequent on the grass-heaths of Kamorta, and more especially in swampy grounds of the valleys.

513. *CYPERUS UMBELLATUS*, Bth. and var. *LEUCOSTACHYA*, spiculis niveis, erectiusculis, radiis brevibus satis congestis.—The white-spiked variety rather frequent in the beach- and coral-reef forests of Katchall; the typical form on Tillangchong (Novara 21; Jelinek 98).





514. *SCIRPUS SUBULATUS*, Vhl. (*S. pectinatus*, N. E.).—Nicobars (*teste* Vahl).

515. *ISOLEPIS* sp.—Locally but socially on barren ground of the grass-heaths of Kamorta.

516. *FIMBRISTYLIS MILIACEA*, Vhl.—Frequent along swampy rivulets on the grass-heaths of Kamorta.

517. *FIMBRISTYLIS COMPLANATA*, Lk.—Not unfrequent along swampy rivulets on the grass-heaths of Kamorta.

518. *FIMBRISTYLIS DIPHYLLA*, Vhl.—Frequent in the grass-heaths of Kamorta especially along rivulets.

519. *FIMBRISTYLIS OVALIS*, NE. and a densely villous variety of it. The glabrous form common on the grass-heaths of Kamorta, the villous form only along one of the numerous rivulets, growing almost in the water.

520. *FIMBRISTYLIS NUTANS*, Vhl.—Not rare along a rivulet on the grass-heaths of Enaca, Kamorta.

521. *FIMBRISTYLIS GLOBULOSA*, Wall.—Locally along swampy rivulets on the grass-heaths of Kamorta.

522. *FUIRENA UMBELLATA*, Rottb.—Locally along marshy rivulets on the grass-heaths of Kamorta.

523. *ANOSPORUM CEPHALOTES* (*Cyperus cephalotes*, Vahl.).—Nicobars (*teste* Vahl).

524. *HYPOLYTHRUM LATIFOLIUM*, Rich.—Not unfrequent in the tropical forests of Kamorta.

525. *HYPOLYTHRUM TRINERVIUM*, Kth.—Great Nicobar (Novara 16; Jelinek 226—*timinjhai* inc.).

526. *RHYNCHOSPORA GRACILLIMA*, Thw. Ceyl. Pl. 435.—Common along a swampy rivulet on the grass-heaths west of Enaca, Kamorta.

527. *RHYNCHOSPORA AUREA*, Vhl.—Not unfrequent along swampy rivulets on the grass-heaths of Kamorta.

528. *RHYNCHOSPORA WALLICHIANA*, Kth.—Common on the dry grass-heaths of Kamorta.

NB. Diedrichsen gives the genus *Diplacrum* as a Nicobar plant, but to judge from some of his remarks thereon, this cannot be correct.

529. *SCLERIA LATERIFLORA*, Boeck., var. *GLABRA*.—In a swampy dell on the grass-heaths west of Enaca, Kamorta.

530. *SCLERIA LITHOSPERMA*, Willd.—Here and there in open places of the tropical forests of Kamorta; Katchall (g. c.).

531. *SCLERIA SUMATRENSIS*, Retz.—Common on the grass-heaths, but also in open places, along paths, etc., in the tropical forests of Kamorta.

532. *SCLERIA* sp. nov. allied to the preceding. Frequent in the grass-heaths of Kamorta.





NB. Unfortunately, I have only brought away a single incomplete specimen of this interesting form, having mistaken it at the time for a variety only of the preceding.

533. *SCLERIA LEVIS*, Retz. Not unfrequent along swampy rivulets on the grass-heaths of Kamorta.

534. *CAREX LONGIARISTATA*, Boott.—Tillangchong (Novara 20; Jelinek 90).

### GRAMINEÆ.

535. *PASPALUM SCROBICULATUM*, L.—Frequent in cultivated and uncultivated places around the penal settlement of Kamorta, often also along rivulets in the grass-heaths.

536. *PASPALUM FLEXUOSUM*, Klein.—Here and there in moist grassy spots along rivulets on the grass-heaths of Kamorta.

537. *PASPALUM CONJUGATUM*, Retz.—Frequent in grass-lands around the settlement and around habitations in the beach-forests of Kamorta.

538. *DIGITARIA* sp. (*Panicum filiforme*, Roxb., vix L.), with a quite glabrous variety.—Common on the grass-heaths and in the beach-forests of Kamorta; the pilose form around the huts of the natives on Katchall.

539. *OPLISMENUS COMPOSITUS*, L.—Frequent in the tropical forests, but found also in the coral-reef- and beach-forests of Kamorta and Katchall; (Novara 3; Jelinek).

540. *PANICUM GLAUCUM*, L.—Here and there on the grass-heaths of Kamorta.

N. B. Dr. Diedrichsen enumerates *Pennisetum* as Nicobarese.

541. *PANICUM COLONUM*, L.—Here and there along swampy rivulets on the grass-heaths of Kamorta.

542. *PANICUM JAVANICUM*, Poir.—Karnicobar (Novara 1; Jelinek 70—*kujop*, inc.).

543. *PANICUM FILIPES*, NE.—Locally in the tropical forests of Kamorta; Pulu Milu (Novara 2; Jelinek 199—*objuab*, inc.).

544. *PANICUM HUMILE*, NE.—Locally frequent in the dry grass-heaths of Kamorta.

545. *THYSSANOLENA ACARIFERA*, NE.—Not unfrequent in open or cleared spots in the tropical forests of Kamorta; Nankowry (Novara 5; Jelinek 135—*petal*, inc.); Karnicobar (Novara 4; Jelinek 28).

546. *ISACHNE MYOSOTIS*, NE.—Rare along a rivulet on the grass-heaths west of Enaca, Kamorta.

547. *ISACHNE* sp. (near *Panicum miliare*, L. but certainly different).—In a swampy rivulet on the grass-heaths west of Enaca, Kamorta.

548. *ISACHNE MILIACEA*, Roth., var. ? *HUMILIS*, more slender, usually 6—8 in. high, the spikelets nearly half the size.—Frequent in swampy rivulets of the grass-heaths of Kamorta.





1876.] S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands.* 161

549. *THOUAREA SARMENTOSA*, Pers. (*Ornithocephalochloa arenicola*, Kurz in Trim. Journ. Bot. 1875, 332, t. 171, fig. 1—18, *teste* Oliver).—Creeping on the sand of the beaches of the western coast of Katchall; *tsigal*, inc. Katch.

550. *CENTOTHECA LAPPACEA*, P. B.—Frequent in the beach-, coral-reef, and tropical forests of Kamorta and Katchall; Trice and Track (Novara 9; Jelinek 187—*upjuab*, inc.).

551. *SPOROBOLUS* sp.—Nicobars (*teste* D.).

552. *ARUNDO ROXBURGHII*, Kth.—Frequent along marshy rivulets of the grass-heaths of Kamorta; Karnicobar, on a swampy grass plain on the northern coast (Novara 6 and 7; Hochstetter and Jelinek 16—*tap*, inc.).

553. *ELEUSINE INDICA*, Gärtn.—Frequent in the beach-forests, and around habitations, of Kamorta and Katchall; also here and there on the grass-heaths.

554. *DACTYLOCTENIUM ÆGYPTIACUM*, Willd.—Here and there on the grass-heaths of Kamorta.

555. *CYNODON DACTYLON*, Pers.—Frequent in the grass-heaths of Kamorta, and very common around the penal settlement, where it has been sown.

556. *ERIACHNE CHINENSIS*, Hance.—A conspicuous constituent of the grass-heaths of Kamorta.

557. *ERAGROSTIS UNIOLOIDES*, P. B.—Here and there on the grass-heaths of Kamorta.

558. *ERAGROSTIS ZEYLANICA*, NE.—Common on the grass-heaths of Kamorta.

559. *ERAGROSTIS PLUMOSA*, Lk.—Around the huts of the natives in the beach-forests of the eastern coast of Katchall; Great Nicobar (Novara 8; Jelinek 237).

560. *MANISURIS* sp.—Nicobars (*teste* D.).

561. *SORGHUM MUTICUM*, NE.—Common on the grass-heaths of Kamorta, growing especially luxuriantly along the outskirts of the forests.

562. *CHRYSOPOGON ACICULATUS*, Trin.—Not unfrequent on the dry grass-heaths of Kamorta.

563. *HETEROPOGON CONTORTUS*, L.—Common on the dry grass-heaths of Kamorta.

564. *SPODIOPOGON* sp. (villous).—Frequent along swampy rivulets on the grass-heaths of Kamorta.

565. *SPODIOPOGON* sp. (quite glabrous).—Karnicobar (Novara 14; Jelinek 76—*vió*, inc.).

566. *SCHIZACHYRIUM BREVIFOLIUM*, NE.—Here and there along steep slopes on the grass-heaths of Kamorta.

567. *ISCHEMUM MUTICUM*, L.—Common on the beaches and in the beach-forests of all the islands; north coast of Karnicobar (Novara 12 and



162 S. Kurz—*A Sketch of the Vegetation of the Nicobar Islands*. [No. 3, 13; Hochstetter and Jelinek 29 and 61—*kijop*, *keljii*, or *tscheljii*, inc.); *auk yu op*, inc. Katch.

568. *IMPERATA ARUNDINACEA*, Cyr.—Locally common on the dry grass-heaths of Kamorta.

\*569. *SACCHARUM OFFICINARUM*, L.—Only cultivated by the natives.

570. *SACCHARUM SPONTANEUM*, L.—Karnicobar, covering large tracts on the northern side (Novara 11; Hochstetter).

571. *DIMERIA* sp.—Here and there on the dry grass-heaths of Kamorta, but the specimens were too old and withered for identification.

572. *BAMBUSA VULGARIS*, Ræusch.—Malacca on Nankowry, probably cultivated.

573. *DINCHLOA ANDAMANICA*, Kurz.—Common in the tropical and coral-reef-forests of Kamorta and Katchall; Great Nicobar (Novara 10; Jelinek 259—*komcha*, inc.).

### LYCOPODIACEÆ.

574. *LYCOPodium PHLEGMARIA*, L.—On trees of the tropical forests of Kamorta.

575. *LYCOPodium LAXUM*, Prsl.—Rare in the tropical forests of Kamorta.

576. *LYCOPodium CERNUUM*, L. (the variety *L. curvatum*, Sw.). Frequent on the grass-heaths of Kamorta.

577. *SELAGINELLA CAUDATA*, Spring.—Common in the tropical forests of Kamorta and Katchall.

578. *SELAGINELLA FLABELLATA*, Sprg.—Nicobars (*teste* Sprengel).

579. *SELAGINELLA TENELLA*, Spring. (*S. imbricata*, John Scott in Journ. Agri. Hort. Soc. Ind. 1868, 260, non Spring.).—Not unfrequent along shady slopes on the grass-heaths of Kamorta.

### FILICES.

580. *GLEICHENIA DICHOTOMA*, Willd.—Common on the grass-heaths of Kamorta.

581. *ALSOPHILA ALBO-SETACEA*, Bedd. in litt. (*A. Mertensiana*, Metten. in Fenzl Reis. Novar. Bot. I. 221, non Kunze).—Here and there in the tropical and coral-reef-forests of Kamorta and Katchall; P. Milu (Novara—Jelinek—*latong*, inc.).

582. *TRICHOMANES JAVANICUM*, Bl.—Here and there along rocky rivulets in the tropical forests of Kamorta.

583. *TRICHOMANES HUMILE*, Forst.—Nicobars (Novara).

584. *TRICHOMANES FILICULA*, Bory.—On mossy trees, not unfrequent in the coral-reef-forests of Katchall.

585. *TRICHOMANES MUSCOIDES*, Sw.—On mossy tree-stems, rare in the coral-reef-forests of the eastern coast of Katchall.





586. *DAVALLIA SPELUNCÆ*, Bak.—Not unfrequent in the tropical and coral-reef-forests of Kamorta and Katchall.

587. *DAVALLIA SOLIDA*, Sw.—Frequent on trees of Kamorta and Katchall.

588. *DAVALLIA ELEGANS*, Sw.—Nicobars (Novara).

589. *DAVALLIA HETEROPHYLLA*, Sm.—Not rare on the trunks of the screw-pines and cocoa-nut-palms in the beach-forests and on the grass-heaths of Kamorta.

590. *DAVALLIA PARALLELA*, Wall.—Not unfrequent, and especially on cocoa-nut-palms, along the coast of Kamorta and Katchall; also found but scantily on screw-pines of the grass-heaths.

591. *LINDSÆA LANCEOLATA*, Lab.—Here and there on the grass-heaths of Kamorta.

592. *LINDSÆA TENERA*, Dry.—Not unfrequent along rocky rivulets in the tropical forests of Kamorta.

593. *ADIANTUM* sp.—Nicobars (*teste* D.).

594. *DICKSONIA* sp.—Nicobars (*teste* D.).

595. *PTERIS LONGIFOLIA*, L.—Nicobars (Novara).

596. *PTERIS REPANDULA*, Lk.—Nicobars (Novara).

597. *PTERIS PELLUCENS*, Hook.—Amongst coral-rocks in the tropical forests of Katchall.

598. *BLECHNUM ORIENTALE*, L.—Here and there along rivulets on the grass-heaths of Kamorta.

599. *CERATOPTERIS THALICTROIDES*, Brongn.—Here and there along swampy rivulets of the grass-heaths of Kamorta.

600. *VITTARIA ELONGATA*, Sw. (and the var. *V. zosteræfolia*, Bory). Rather frequent in the coral-reef and tropical, rarely in the beach-forests, of Katchall and Kamorta.

601. *ANTROPHIUM CALLEFOLIUM*, Bl.—Not unfrequent in the coral-reef-forests of Katchall.

602. *ASPLENIUM NIDUS*, L.—Common in the tropical and coral-reef-forests of Kamorta and Katchall.

603. *ASPLENIUM MACROPHYLLUM*, Sw.—Frequent in the tropical and coral-reef-forests of Katchall and Kamorta.

604. *ASPLENIUM* (*DIPLAZIUM*) sp.—Nicobars (*teste* D.).

605. *POLYPODIUM PHYMATODES*, L.—Common in the beach-forests of Kamorta and Katchall.

606. *POLYPODIUM QUERCIFOLIUM*, L.—Frequent on trees of the beach- and tidal forests of Kamorta and Katchall.

607. *POLYPODIUM LONGISSIMUM*, Bl.—A few specimens only in bushes along a swampy rivulet in the grass-heaths west of Enaca, Kamorta.

608. *POLYPODIUM IRIOIDES*, Poir.—Nicobars (Novara).

609. *POLYPODIUM ADNASCENS*, Sw.—Common everywhere in all the forests of Kamorta and Katchall.





610. *NEPHROLEPIS ACUTA*, Prsl.—Frequent in the coral-reef- and tropical forests of Kamorta and Katchall.

611. *NEPHRODIUM DECURRENS*, Bak.—Nicobars (Novara).

612. *NEPHRODIUM PROPINQUUM*, R. Br.—In large quantities along one of the swampy rivulets on the grass-heaths of Kamorta.

613. *NEPHRODIUM MOLLE*, Desv.—Frequent in the tropical forests of Kamorta.

614. *NEPHRODIUM PROLIXUM*, Bak.—Not rare in the tropical forests of Kamorta.

615. *NEPHRODIUM TRUNCATUM*, Bak.—In the tropical forests of Kamorta.

616. *GYMNOGRAMME* sp.—Nicobars (*teste* D.).

617. *STENOCHLENA SCANDENS*, J. Sm.—Common in all forests of Kamorta and Katchall.

618. *ACROSTICHUM AUREUM*, L.—Frequent in salt-marshes and tidal and mangrove swamps of all the islands; on Kamorta it frequently recurs along the marshy fresh water rivulets on the grass-heaths.

619. *LYGODIUM CIRCINNATUM*, Sw.—Common in the tropical forests of Kamorta and Katchall.

620. *LYGODIUM SCANDENS*, Sw.—Here and there amongst long grass and shrubbery along rivulets on the grass-heaths of Kamorta.

621. *LYGODIUM PINNATIFIDUM*, Sw.—Not unfrequent amongst long grass and shrubbery along rivulets on the grass-heaths of Kamorta.

622. *OPHIOGLOSSUM PENDULUM*, L.—Nicobars (Novara).

623. *HELMINTHOSTACHYS ZEYLANICA*, Hook.—Along a swampy rivulet below the old cattle-shed on the grass-heaths near the settlement on Kamorta; also in the swamp on the island Milu (Diedrichsen).

624. *ANGIOPTERIS* sp.—Nicobars (*teste* D.).

#### EXPLANATION OF THE PLATES.

Plate XII. *Anomum Fenzlii*. Fig. 1, flowering scape, nat. size (the bracts are represented by mistake as hirsute: they are glabrous except on the margins); fig. 2, a portion of the stem and leaf, shewing petiole and produced sheath, nat. size; fig. 3, flower, nat. size; fig. 4, ditto, expanded; fig. 5, labellum, slightly enlarged; fig. 6, genitalia and staminodes; fig. 7, anther, from the side; fig. 8, ditto, from behind; fig. 9, staminodes; fig. 10, fruit, nat. size; fig. 11, seeds, nat. size; fig. 12, ditto, slightly enlarged.

Plate XIII, Figs. 1—7. *Trichoglottis quadricornuta*. Fig. 1, flowering branch, nat. size; fig. 2, flower from the front; fig. 3, ditto, from behind; fig. 4, dissection of the same; fig. 5, the column and labellum, from the side; fig. 6, labellum; fig. 7, transverse section of the same made between the two pairs of horns.

Figs. 8—12. *Eulophia decipiens*. Fig. 8, flowering plant, nat. size; fig. 9, flower from the front; fig. 10, column and labellum, from the side; fig. 11, labellum; fig. 12, pollinia. (All the figures except figs. 1 and 8 more or less enlarged.)



XI.—*Description of Golunda Elliotti from Sind.*

By W. T. BLANFORD, F. R. S.

(Recd. June 28th ;—Read August 2nd, 1876).

(With Plate X.)

Amongst a few mammals and reptiles in spirit, collected and given to me by Mr. H. E. Watson of the Sind Commission, are two specimens, one adult, the other young, of a mouse or small rat with very coarse, flat, grooved hairs and the upper incisors sulcated. These mice were obtained on the southern extremity of the Khirthar, a range of mountains which forms the western boundary of Upper Sind, but which enters the province nearly west of Sehwan, and running thence south-south-east, terminates about 40 miles south of Sehwan and rather more than 50 north-west of Kotri. At their southern extremity these hills are 2300 feet high, to the north they are from 4000 to 6000, some peaks being even higher.

The skull of the larger specimen, on being extracted, proves to be of the ordinary murine type, and the only peculiarity is in the characters of the teeth. The upper incisors are grooved, and the molars, instead of being simply tuberculate, as in *Mus*, appear to be formed of deep folds of enamel, as in *Gerbillus* or *Nesokia*, but the form of the folds is widely different from what it is in those genera; each fold consisting of a number of deep lobes or pillars with a nearly semicircular section. Thus the upper surface of the crown of the tooth has a most peculiar reticulated appearance. The semicircular lobes are arranged throughout the teeth in three longitudinal series in the upper, and two in the lower jaw. In older specimens the lobes may run more into each other, but the skull examined is fully adult.

No description or figure, so far as I am aware, of the teeth of any Indian mouse has ever been published exhibiting the peculiarities above described. The published descriptions of the molar teeth in *Leggada* and *Golunda* appear to me to differ materially from those of the specimen from Sind. The incisors in *Leggada* are nowhere said to be grooved, and no mention is made in any of the descriptions of *Golunda* by Gray,\* Elliot,† or Jerdon,‡ of flattened or grooved hairs. I unfortunately did not at first examine the specimens of *Golunda Elliotti* in the Indian Museum sufficiently carefully, as the description both of the fur and dentition appeared to me to refer to

\* Charlesworth's Mag. Nat. Hist. I, 1837, p. 586.

† Mad. Jour. Lit. and Science, X, 1839, p. 213.

‡ Mammals of India, p. 212.





a very different form. The only murine genus of which I could find a description with dentition resembling that in the Sind species was *Pelomys*\* of Peters, founded on an African rat from Mozambique. I concluded that the Sind rat was a new species of *Pelomys*, and I proposed to call it *P. Watsoni*. This name was unfortunately published in the Proceedings of the Society for August before I had discovered my mistake.

For this discovery I am indebted to Professor Peters, to whom I sent a sketch of the molars of the Sind rat, which I asked him to compare with those of *Pelomys*. This he did and told me that they agreed. He also called my attention to the circumstance that the coffee-rat of Ceylon, of which he had received a specimen, closely resembled *Pelomys* in its dentition and even in its external characters, and he suggested that the genera *Golunda* and *Pelomys* were identical. Upon this I re-examined the specimens marked *Golunda Elliotti* in the Museum, and to my surprise found that they coincided with mine from Sind; and the skull of one specimen which Dr. Anderson very obligingly allowed to be extracted for me proved identical with that of the Sind rat. I, however, noticed that in these specimens, perhaps because they have been exposed for years, the grooved hairs have split at the ends, and present the appearance of ordinary round or nearly round hairs, so that it is necessary to examine the fur closely in order to detect its peculiarity. I also find that the Sind rat agrees excellently in characters and dimensions with Kelaart's original description,† and that Mr. Blyth‡ has already called attention to the differences between the coffee-rat of Ceylon and the description of the *Gulandi* (*Mus hirsutus*, Elliot, said to be identical with *Golunda Elliotti*, Gray) given by Mr. (now Sir Walter) Elliot.§ I ought not to have overlooked these facts, but I must say in apology that I do not think any one could have identified the Sind rat from the published descriptions of *Golunda Elliotti*.

Before discussing the synonymy of this rat, I will give a description of the Sind specimen.

*Description taken from an adult female specimen preserved in spirit.* General colour brown above, the colour not being uniform but a mixture of black and fulvous, dirty white (isabelline) below. The hairs are very flat with a broad groove down one side. The fur is harsh, dusky grey at the base, then darker, tawny towards the extremities on the back, pale tawny on the abdomen; numerous longer hairs, either blackish throughout, or

\* Reise nach Mossambique, Säugethiere, p. 157, Pl. XXXIII, Fig. 3, XXXV, Fig. 9.

† Prodromus Faunæ Zeylanicæ, p. 67.

‡ J. A. S. B., 1863, p. 351, and Catalogue Mam. Mus. As. Soc. p. 121, foot-note.

§ Mad. Jour. Lit. Sci. l. c.



with a pale tip, being scattered over the back, and producing the brown colour, which resembles that of a hare (*Lepus europæus* v. *L. ruficaudatus*). The average length of the hairs in the middle of the back is rather less than half an inch; the longer hairs measure 0·6 to 0·7 of an inch. The whiskers are black near the base, brown towards the ends, the longest being about the same length as the head. Muzzle thickly clad with short hair.

The ears are rounded, nearly naked, having only very short scattered hairs outside, but thinly clad with brown hair inside. The feet are pale brown above, the soles naked. The tubercles on the soles are well developed; on the fore-foot there are five, three arranged in a triangle at the base of the three middle toes, and two rather larger, close together, and nearly parallel, behind. The rudimentary hallux is behind the former tubercles and in front of the latter; it is furnished with a small flat nail; the other claws are compressed. In the hind-feet all five toes are furnished with compressed claws, much longer than those on the fore-toes. The second, third, and fourth hind-toes are nearly equal in length, the middle toe being scarcely longer than the others, and the fourth a little shorter than the second; the first and fifth toes also are subequal, the first being 7 mm. (0·27 inch) shorter than the second. The tubercles on the sole are in three pairs, each pair being nearly parallel, and the middle pair rather farther apart than the other two. The claws are pale horny in colour. The tail is stout at the base and tapers gradually to a fine point; it is rather shorter than the head and body, finely ringed, and thinly clad with short bristly hairs, which are black above, tawny on the sides and below. There are 2 pectoral and 2 inguinal pairs of mammæ.

The skull is typically murine, the deep fissure running downwards from the large infraorbital foramen being open as in ordinary rats; there is a well marked crest which runs along the edge of the frontal bones above the orbit, and is continued back over the parietal bones. The interparietal is convex behind and nearly straight in front; it is about half the breadth of the skull. The zygomatic arch is strong. The anterior palatine foramina (*foramina incisiva*) are very long and extend fully two-thirds the distance from the incisors to the molars, but their hinder termination is in front of the molar teeth. The incisors in both jaws are deep orange externally; those of the upper jaw are flat in front and have a rather deep longitudinal groove near the external edge; those of the lower jaw are flattened in front and smooth. The upper molars are broad with low crowns; the bony palate narrow. The surface of the upper molars consists of nearly semicircular lobes arranged in three longitudinal series, each lobe having its convex margin directed forwards. The anterior upper molar contains 7 lobes, three in the middle which are rather longer than the others, two inside which are rather less, and two outside which are the smallest of all. The two outer



lobes are parallel to the inner pair, but intermediate in position to those of the middle row. The second upper molar consists of 6 lobes, one of which, however, which is external and anterior, is very minute; of the other five two belong to the middle row, two to the inner, one to the outer, the posterior middle lobe having a spur on the outer side; the hinder upper molar has but 4 lobes, two belonging to the middle, and two to the inner row; the hindmost lobe belonging to the middle row is very small. The lower molars are nearly uniform in breadth, the first being a little narrower in front and consisting of seven lobes, 3 on each side, and a minute additional lobe in the middle behind; the second contains 5 lobes, two on each side, and a minute supplementary lobe in the middle behind; the last molar contains 4 lobes, two internal, one external, and a minute additional lobe in the middle at the back of the tooth; all these lobes in the lower molars, except the small supplementary talons and the hinder inner lobe of the last molar, are arranged in pairs, and the inner lobes are a little larger than the outer.

The following are dimensions in inches and parts of a metre, taken from the specimen preserved in spirit and from the skull extracted from it.

|                                                                                   | inches. | metre. |
|-----------------------------------------------------------------------------------|---------|--------|
| Total length from nose to end of tail, .....                                      | 8·65    | ·219   |
| Length from nose to anus, .....                                                   | 4·55    | ·116   |
| „ of tail, .....                                                                  | 4·1     | ·105   |
| „ of ear from orifice, .....                                                      | 0·57    | ·014   |
| Breadth of ear, .....                                                             | 0·57    | ·014   |
| Length of fore-foot (not including claws), .....                                  | 0·42    | ·011   |
| „ of hind-foot (ditto), .....                                                     | 0·9     | ·0225  |
| „ of longest whisker, .....                                                       | 1·3     | ·032   |
| „ of skull from occipital plane to end of nasal bones, .....                      | 1·22    | ·0305  |
| Greatest breadth of skull across hinder part of zygomatic arches, .....           | 0·62    | ·015   |
| Length of suture between nasal bones, .....                                       | 0·42    | ·0105  |
| Breadth of frontal bones between orbits, .....                                    | 0·19    | ·005   |
| Length of anterior palatine foramina, .....                                       | 0·22    | ·0055  |
| „ of row of upper molars, .....                                                   | 0·26    | ·0065  |
| Breadth of bony palate between anterior upper molars, .....                       | 0·05    | ·0015  |
| Length of lower jaw from angle to symphysial extremity (incisors excluded), ..... | 0·68    | ·017   |
| Height of do. to coronoid process, .....                                          | 0·42    | ·0105  |
| Length of row of lower molars, .....                                              | 0·23    | ·006   |

I have already mentioned that this rat is identical with specimens in the Indian Museum, Calcutta. The two skins which I have compared are





from the Asiatic Society's collection, and one of them is *Golunda Elliotti* No. 297 D. of Mr. Blyth's Catalogue from Southern India, presented by Mr. Elliot. The other, of which the label has been lost, is doubtless No. 297 E from Ceylon. These specimens, as already stated, agree very well with Kelaart's description of his *Golunda Elliotti* (*Mus coffæus*),\* but, as was remarked by Mr. Blyth, they do not agree with *Mus hirsutus*, Elliot,† although the specimens from Southern India appear to have been sent as representing that species, or at least *Golunda Elliotti*, with which *Mus hirsutus* was identified by Dr. Gray.

*Mus hirsutus*, the *Gulandi* of the Canarese, is described by Elliot as being  $10\frac{1}{2}$  inches long, of which the head and body measure  $6\frac{3}{4}$ , and the tail  $4\frac{3}{8}$ , whilst the head is only  $1\frac{1}{8}$  in. It is of course possible that these measurements were taken from a stretched skin, and that of the tail agrees fairly with the form above described, though its proportion to the body appears very different. But there are other distinctions: the ears are said to be villose, and although the fur is not described, a preliminary list of the species of rats and mice‡ in the South Mahratta country is given, in which the following are classed as having tuberculated molars and soft hairs—*Mus decumanus*, *rattus*, *mettade* (*lanuginosus*), *golundee* (*hirsutus*), *oleraceus*, *rufus*, and *musculus*—and opposed to *M. platythrix* and *M. Boodaga* said to have tuberculated molars and to be covered with hair and spines.

The original description of *Golunda Elliotti*, Gray,§ like too many of that author's descriptions, is quite insufficient for determination. Not a word is said of flat hairs: the fur is described as "pale brown, with minute very slender, hair pointed black tips." The ears are said to be "covered with short hairs." No dimensions are given. The description is included in a paper entitled "Description of some new or little-known Mammalia, principally in the British Museum Collection." In the list of Mammalia in the British Museum, p. 113, the only specimen of *Golunda Elliotti* mentioned is stated to be from Madras and to have been presented by Walter Elliot, Esq. In this list *Mus hirsutus*, Elliot, is identified with *Golunda Elliotti*. It is to be noted that in the original description of *Golunda Elliotti* the habitat was said to be Bombay. Without consulting the British Museum specimens it is impossible to say whether the specimen presented by Mr. Elliot was the original type or not, but to judge from the name it probably was, so that there can be very little doubt of the

\* Prod. Faun. Zeyl., l. c.

† Mad. Jour. Lit. and Sci. X, p. 213.

‡ *Ib.*, p. 208.

§ Charlesworth's Mag. Nat. Hist. I, p. 586.



identification of *Mus hirsutus* with *Golunda Elliotti*; and as the skin sent from Madras by Mr. Elliot as a specimen of the *Gulandi* is identical in species with the Ceylon coffee-rat, as well as with the specimen from Sind, there is no choice but to follow Mr. Blyth and consider all as belonging to one species, until the types can be compared.

Judging by the description alone, I should have thought the coffee-rat agreed much better with the description of *Mus platythrix*, Bennett, which is described as having flattened spines, naked ears, and the tail nearly as long as the body. The dimensions are smaller: head and body  $3\frac{1}{4}$  inches, tail 3; but the proportions and colouration agree, and the type may not have been full grown. This form, however, is, by Elliot, identified with the *Leggyade*, an animal of very different habits from the *Gulandi*.

The question of synonymy must, therefore, be deferred. Meantime, the identification of an Indian rat with the African genus *Pelomys* is of some importance as adding another to the number of generic forms common to India and Africa, but not known to be represented to the eastward.

*Pelomys fallax* resembles *Golunda Elliotti* in colouration, general form, and dentition, but it differs widely from it in its other characters and in its habits. It is a much larger animal, the adult being about 300 millimetres [12 inches] long from nose to end of tail. It has a differently shaped head,\* with the ears much smaller in proportion; the fur of *Pelomys fallax* is simply described as harsh and finely bristly (*hart und feinborstig*), so that it probably presents none of the remarkable characters found in *Golunda Elliotti*. *P. fallax* is said to be found in marshy places, whilst *Golunda Elliotti* inhabits bushes on hill-sides.†

P. S.—Since the above was in print, I have received from Mr. Fairbank a specimen of the true *Gulandi*, brought to him at Ahmednagar by men of the Wadari or tank-diggars caste, the very people from whom Sir W. Elliot appears to have procured his specimens. These people hunt and eat rats and necessarily know all the species. The animal sent, an adult female, is specifically identical with the Sind rats and with those from Southern India and Ceylon, so there can no longer be a doubt as to the propriety of referring all to *Golunda Elliotti*. The face is not so convex as in the figure attached to this paper. The measurements are:—

\* In the accompanying figure taken from the specimen in spirit after the skull had been extracted, the convexity of the face is much exaggerated. This is the form of the young animal only, I think. The head in the adult is very slightly convex.

† Whilst this paper was passing through the press, I also received from Mr. Fairbank specimens of the *mettad*, *Golunda mettada*, Gray, obtained at Ahmednagar. They differ so much from *G. Elliotti* that I doubt if the two forms are congeneric. In *G. mettada* (potius *mettada*) the incisors are not sulcated, the molars differ but little from those of *Mus*, and the palate is much broader than in *G. Elliotti*.



|                                              | in.  |
|----------------------------------------------|------|
| Length from nose to insertion of tail, ..... | 4.75 |
| „ of tail, .....                             | 4.   |
| „ of hind foot, .....                        | 0.92 |
| „ of ear from orifice, .....                 | 0.6  |

A specimen of a rat obtained by Mr. V. Ball in the Sâtpura Hills and presented by him to the Indian Museum, also belongs to this species.

### EXPLANATION OF PLATE X.

Fig. 1. Head of *Golunda Elliotti*, Gray, from Sind (the face is represented much too convex). 2. Right hind-foot. 3. Right fore-foot (the intermediate tubercle should have been drawn further away from the posterior (proximal) pair). 4. Under view of the skull. 5. The skull and mandible, seen from the side. 6. Upper view of the skull. 7. Incisors, seen from the front. 8. Molars of upper jaw, right side. 9. Do. of lower jaw, right side.

### XII.—*On the Cyclostomacea of the Dafla Hills, Assam.*—By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S., Deputy Superintendent Topographical Survey of India.

(Received June 24th ;—Read August 2nd, 1876.)

(With Plates VII & VIII, A, Figs. 1—6.)

The expedition into the Dafla Hills in the winter of 1874—75 has added very largely to our knowledge of the land-shells of that part of India. The line of the Himâlayas has been very well worked up to the neighbourhood of Darjiling, and the researches of the Messrs. Blanford and the late Dr. Stoliczka have left I suspect very few forms undiscovered in that quarter, but from thence to the Dafla Hills, a distance of 270 miles, we had received nothing, so that when I found myself deputed for survey duty in these more eastern hills, I anticipated a goodly haul of molluscan forms, and am glad to say I have not been disappointed. The present list is confined to the operculated group, numbering some 33 species; of which 11 are new; 5 had been originally described from Darjiling and have their range thus extended far to the eastward; 13 are well-known forms in the Khasi and Naga hill-ranges south of the Brahmaputra River; and 3 or 4 are known to extend thence to the Shan States in the Irrawaddy drainage-system. The list of *Helicidæ* will be given in a second paper, in the prepa-



ration of which I hope to be joined by Mr. G. Nevill of the Indian Museum, Calcutta; and will comprise some 45 species, many of which are new. I had ample opportunities for collecting, especially while forest-clad peaks were being cleared for the triangulation. The weather, which during the whole of January was so very wet as to render the taking of observations for days together an impossibility, was just the kind that was wanted to tempt the smaller forms forth from their hiding places in the decaying leaves and old tree-stumps. In some of the Khasi and Goorkha men of the Survey party I found most energetic and excellent collectors, who soon were as sharp with their eyes in detecting the minute little shells as I myself was. It caused them at first infinite amusement and still greater curiosity as to what possible use they could be put to: "Calcutta jádú ghur ke waste," however, generally satisfied all queries on the subject, and a general impression prevailed that we made medicine of them.

*Abstract of Genera.*

|                                 | Darjeeling. | Khasi. | Dafu. | Total. | Remarks.                              |
|---------------------------------|-------------|--------|-------|--------|---------------------------------------|
| 1. <i>Cyclophorus</i> , .....   | 1           | 3      | 3     | 7      |                                       |
| 2. <i>Lagocheilus</i> , .....   | ..          | 1      | ..    | 1      |                                       |
| 3. <i>Pterocyclos</i> , .....   | ..          | 1      | ..    | 1      |                                       |
| 4. <i>Spiraculum</i> , .....    | ..          | 1      | 1     | 2      |                                       |
| 5. <i>Alycaeus</i> , .....      | ..          | 3      | 6     | 9      | 3 being varieties of Khasi species.   |
| 6. <i>Diplommatina</i> , .....  | 1           | 2      | 3     | 6      | 1 being a variety of a Khasi species. |
| 7. <i>Pupina</i> , .....        | ..          | 1      | ..    | 1      |                                       |
| 8. <i>Streptaulus</i> , .....   | 1           | ..     | ..    | 1      |                                       |
| 9. <i>Megalomastoma</i> , ..... | 1           | ..     | 1     | 2      |                                       |
| 10. <i>Pomatias</i> , .....     | 1           | 1      | 1     | 3      |                                       |
| Total, ....                     | 5           | 13     | 15    | 33     |                                       |

No specimens of either of the genera, *Cyathopoma*, *Georissa*, or *Hydrocæna*, which come in on the hill-ranges south of the Brahmaputra, were found: they are apparently absent.



*CYCLOPHORUS AURORA*, Bs.

Agrees with the specimens from Dalingkote, Western Bhutan Dúars.

*CYCLOPHORUS PEARSONI*, Bs.

Outer Range.

*CYCLOPHORUS FUSCICOLOR*, n. sp., Pl. VIII, A, Fig. 1.

Shell umbilicated, globosely turbinate, covered with a greyish umber-brown epidermis, with radiating longitudinal lines of ornamentation, the bands of colour rather broader towards the apex, but throughout very close together, in some specimens coalescing on the last whorl into a uniform dark shade of brown. Spire conical, apex sharp. Whorls 6, well rounded, with a single slightly raised ridge upon the keel. Aperture circular, sub-oblique, peristome continuous, double, very slightly reflected. Within the aperture grey.

Alt. 1.24, major diam. 2.30 inches.

HAB.—Dacca Hills.

This is a very distinct form allied to *C. Bensoni* from the southern face of the Khasi Hills, shewing towards the apex in some specimens a tendency to the zigzag painting of that shell, but the uniform, striate, and sober colouring of the rest of the whorls is a very marked character. Two specimens have a moderately broad white band on the periphery, owing to the abrasion of the epidermis upon the raised ridge of the keel.

*CYCLOPHORUS EXPANSUS*, Pfr.

HAB.—Outer sandstone range.

*CYCLOPHORUS ZEBRINUS*, Bs.

HAB.—Outer range,—very abundant.

*CYCLOPHORUS (MYXOSTOMA) NIVICOLA*, n. sp., Pl. VII, Figs. 1 & 1a.

Shell flatly discoidal, openly umbilicated. Whorls 5, with distinct longitudinal striation, the last well rounded on the periphery, large, the rest rapidly decreasing, covered with a thick epidermis, colour dark brown-umber. At half the circumference from the apex fine zigzag pale ochreous markings ornament the upper surface; these widen and are arranged closer towards the apex, which is pale; a black band on the periphery is bounded by a pale narrow one. Spire slightly raised. Suture deep. Aperture oblique, very slightly descending, circular. Peristome thickened, double, reflected, with a small re-entering notch near the suture. Operculum corneous, flat.

Major diam. 1.0, alt. 0.45 in.





HAB.—Dafla Hills.

This form is a representative here of the Ceylonese *C. Bairdii*. A variety of the same size but plain, with pale band on the periphery, on Torúpútú Peak. Small (major diam. 0.65 in.) varieties also occur, both ornamented and plain; the latter are very similar in size and light ochreous colouration to *C. ravidus* of the Nilgiri Hills, but the former have fine zigzag markings and a single black band on the periphery.

LAGOCHEILUS TOMOTREMA, Bs.

HAB.—The Tánir ridge and Torúpútú Peak,—not common.

PTEROCYCLOS PARVUS, Pearson.

HAB.—Shengorh, Tánir ridge, and Torúpútú.

PTEROCYCLOS MAGNUS, n. sp., Pl. VII, Figs. 3, 3a, & 3b.

This shell is similar in form to *P. parvus*, only that the winged portion of the peristome is far more fully developed and folded round into a perfect, largely developed tube with its internal orifice just within the aperture, the inner lip being deeply notched to give room for it. The shell is ornamented with a single black peripheral band and with minute transverse brown zigzag markings. Apex very flat. Whorls 5, rounded.

The largest example measures—alt. 0.26, major diam. 0.95, minor diam. 0.75, apertural tube 0.20 in.

HAB.—Very common in the outer sandstone range, Dafla Hills. It is also found on the northern side of the Nágá Hills, but has hitherto never been separated from *P. parvus* of the Khasi Hills, of which it may be said to be a more developed form, with stronger affinities to the genus *Spiraculum*.

SPIRACULUM HISPIDUM, Pearson, var. MINOR.

HAB.—The outer ranges near Dihiri Parbat. Agrees precisely with specimens from Teria Ghat. It is curious, however, to note that the large variety does not occur here, but that its place is occupied by another new form equally large, which I next describe.

SPIRACULUM NEVILLI, n. sp., Pl. VII, Figs. 2 & 2a.

Shell discoidal, convexly depressed, widely umbilicated, covered with a dark brown epidermis which soon becomes eroded, and with an incipient dark band on the keel in perfect specimens. Spire very slightly raised, suture deep, whorls 5, much rounded, the last descending slightly towards the aperture. The sutural tube is only 0.10" in length, 0.3" behind the aperture, turns back, and is situated close to the suture. Aperture oblique, circular. Peristome double, inner lip continuous, having at the suture a re-enter-



ing angular notch, the outer is similarly notched and then expanded and folded into a spout-shaped form. Operculum not seen, probably as in *S. hispidum*.

Alt. 0.36, major diam. 1.05, minor diam. 0.92, diam. apert. 0.45 in.

HAB.—Two specimens only were obtained near Dihiri Parbat, on the outer sandstone range.

This *Spiraculum* is quite distinct from *S. hispidum*, for which I mistook it when found, and consequently omitted to search for more examples. In the form of the sutural tube it most nearly resembles *S. Avatum*, W. Blf., thus differing very considerably from *S. hispidum*, in which that part is broad and curves quite over and across the suture in well-grown shells (pl. vii, fig. 4). The most notable point of difference, however, is the expansion of the outer lip into a tube-like process, in which respect the species shews its very close affinity to the genus *Pterocyclos*.

#### ALYCEUS KHASIACUS, G-A.

HAB.—One specimen of the true typical form was found in the Yétay ravine, Dikrang Dhún.

#### ALYCEUS KHASIACUS, var.

The rest of this type from other parts of the hills, however, differ from the Khasi form, in the ridge in front of the constriction being single, and the peristome more thickened and reflected. But in size, sculpture, and the short thickened sutural tube, as well as in the operculum, no change is to be detected.

HAB.—Valley of the Dikrang and Borpani.

#### ALYCEUS CRISPATUS, G-A.

HAB.—A conical form of this shell was obtained in the Burroi gorge.

#### ALYCEUS THEOBALDI, Bs., var., Pl. VII, Fig. 10.

Is of the same form as *A. Theobaldi* from Cherra Poonjee and the Gáro Hills, only that while the operculum in the latter is exceedingly closely wound, quite smooth in front, and black (and I have examined some dozens of shells), in the former the concentric whorls are wider apart, have a central circular hollow space, and are white. The ribbing of the swollen portion in the Dafla shell is exceedingly minute, and this, I note, is a common character, holding good almost without exception, of all the species in the Dafla Hills. There is, moreover, a slight difference in the contraction of the whorl near the umbilicus, but I hesitate to separate two such close forms, notwithstanding that if dozens of each variety were thrown together, they might all be resorted without a mistake, and I have





a large series. It has yet to be decided what points are to be considered of sufficient weight in separating these forms from one another. We must wait until the whole area has been worked, and the points of difference, however small, all noted, when we shall then be in a position to reduce species or to arrange slightly divergent forms around their nearest and most abundant and widely spread ally. As far as my experience goes, they never remain constant over very large areas.

HAB.—The above shell was obtained on the slopes of Torúpútú.

*ALYCEUS BURTII*, G-A.

HAB.—This shell, of which I previously possessed a single specimen only, found by Mr. J. Burt in the gorge of the Barowli river a short distance to the west, proved to be abundant on the outer sandstone range about Dihiri Parbat, the Burroi gorge, &c.

A variety of it, which is much larger and more depressed in form, but which in the crenate peristome and in form of constriction is the same, occurred in the valley of the Dikrang and in the Yetay ravine. This variety measures in alt. 0.18, major diam. 0.25. in.

*ALYCEUS NOTATUS*, n. sp., Pl. VII, Figs. 9, 9a, & 9b.

Shell globosely turbate, narrowly umbilicated, of solid form, white, distant strong costulation on the upper whorls, close and fine ribbing on swollen portion of the last. Spire conoid, suture fairly impressed. Whorls  $4\frac{1}{2}$ , closely wound, the last swollen, then sharply constricted, and again enlarged and descending, the expanded portion being marked with deep fold-like furrows. Sutural tube moderate, aperture oblique. Peristome very thick, distinctly treble in full-grown shells, outer layer terminating just behind the aperture, the inner continuous, the two outer much reflected near the umbilicus. Operculum smooth in front.

Alt. 0.14, major diam. 0.17. in.

HAB.—On the slopes of Torúpútú Peak at 3000 feet, about 15 specimens collected.

This is one of the most distinct and curious species I have yet discovered, the fold-like indentations upon the expanded portion near the aperture having no counterpart in any other form with which I am acquainted. In other respects it is somewhat similar to *A. diagonalis*, in the strong thick peristome and closely wound whorls.

*ALYCEUS DAFLAENSIS*, n. sp., Pl. VII, Figs. 12, 12a, & 12b.

Shell turbate, moderately umbilicated, pale whitish or dull ochreous according to the state of the epidermis, finely ribbed throughout, rather more coarsely near the commencement of the swell of the last whorl, on this por-



tion the ribbing is very fine and close. Spire conoid, apex blunt, suture impressed, the sutural tube moderate. Whorls 4, the last swollen, then constricted, and enlarging again into a well-raised ridge, which terminates below on margin of the peristome, it then descends and expands considerably with four deep longitudinal plications. Peristome single (no sign of the usual outer margin), continuous, with five plications on the outer margin, the lower margin recurved. Aperture oblique. Operculum multispiral, horny, with a large disc-like boss in the centre front side.

HAB.—Torúpútú Peak, 7000 feet.

The nearest form to the above is *A. digitatus*, H. Blf., described and figured in J. A. S. B., Vol. XL, 1871, from Darjeeling, but the duplicate peristome in that shell is conspicuous and forms a well-defined sharp edge where the expansion and plication of the inner lip commences. By the operculum alone it can be at once distinguished, and it is besides a much smaller shell.

A dwarf variety occurs on Shengorh peak only 0·09 in alt., not so expanded near the aperture, and with the plication less developed. On the Tánir ridge at 4000 feet, the same shell, of ordinary size and with the same character of the aperture, occurs, shewing an interesting and gradual change in form; the operculum is also different, being pale coloured, multispiral, and flatly concave in front. This form is in this respect much nearer to *A. digitatus* and might be separated under the title *sub-digitatus*.

ALYCEUS MUTATUS, n. sp., Pl. VII, Figs. 11 & 11a.

Shell sub-turbinate depressed, openly umbilicated, fragile, covered with a scabrous dull ochreous epidermis, which peels off in old shells, very regularly and strongly striated throughout, the ribbing on the last whorl very fine. Spire sub-conoid, apex rather blunt, suture deeply impressed. Whorls 4, rounded, the last swollen, moderately constricted, then again expanded and crossed by two ridges, the last of these not extending all round the whorl. The constriction very regularly ribbed. Sutural tube short, thickened at the base. Aperture oblique, circular. Peristome double but closely united, very slightly reflected. Operculum multispiral, the edges of the outer whorls in high relief so as to form a deep cup-like hollow in the centre.

Alt. 0·10, major diam. 0·20, sutural tube 0·055 in.

HAB.—On Torúpútú, Tánir, and Shengorh Peaks, at 6—7000 feet elevation, in the dead leaves and moss about the roots of the forest trees, I found about a dozen. The ground at the time was covered with snow, so that it was very cold work hunting for them.

This shell is an interesting ally of *A. Khasiacus*, from which it differs in its thick well-ribbed epidermis, but more especially in the very different



form of the operculum, which in *Khasiacus* is quite smooth and concave in front. It is also a smaller and more delicately formed shell.

*ALYCÆUS (DIORYX) GRAPHICUS*, Blf., var.

HAB.—Both in the Dikrang Dhún and on Torúpútú Peak.

*ALYCÆUS (DIORYX) URNULA*, Bs., var.

Higher in the spire, aperture proportionally larger; whorls more rounded, sutural tube only one-fourth the length, and the ribbing much less fine on the swell of the whorl—differences which by some would be considered quite sufficient to warrant another name being given to this Dafla form. Five specimens were found all possessing the above character, so it would appear to be quite constant.

*DIPLOMMATINA POLYPLEURIS*, Bs., var.

HAB.—Borpani, Sújúli, and Dihiri Parbat on outermost range.

*DIPLOMMATINA POLYPLEURIS*, var. *MINUTA*.

HAB.—Shengorh and Torúpútú Peaks.

*DIPLOMMATINA SEMISCUPTA*, W. Blf.

HAB.—Borpani and Dikrank valley,—a good many specimens obtained.

*DIPLOMMATINA AUSTENI*, W. Blf., large var., Pl. VII, Figs. 8 & 8a.

Shell dextral, ovate fusiform, moderately thick, pale horny. Sculpture very fine, almost disappearing on the two last whorls. Sides of spire moderately flat. Whorls 7, penultimate and antepenultimate the largest, the last ascending slightly. Constriction in middle of aperture, which is circular and vertical; columellar margin rounded, tooth moderate. Peristome simple, double, rather strongly formed, the inner lip continuous.

Alt. 0.15, diam. 0.70 in.

HAB.—Low down on the left bank of the Dikrang river;—about a dozen were found.

This shell is very similar in form to *D. Austeni*, W. Blf. from the Khasi Hills, but it is much larger, that shell only being 0.90" in length, and the two last whorls are not so smooth and shew slight traces of sculpture, but the two are too close to be separated.

*DIPLOMMATINA HOMEII*, n. sp., Pl. VII, Fig. 6.

Shell dextral, ovate, tumidly fusiform, strong, dull ochreous, very fresh shells often ruddy orange-coloured, sculpture very fine and filiform on the upper whorls, rather coarser on the last approaching the aperture. Spire



with sides rather flat, penultimate and antepenultimate whorls about equal, the last whorl has the constriction in the middle of the aperture, and ascends to it. Aperture vertical, columellar margin angular below, the tooth well developed and placed low down; outer margin rounded. Peristome thick, double, both lips continuous and well reflected on outer margin.

Alt. 0.24, diam. 0.14, diam. apert. 0.08 in.

HAB.—In forest on the peaks of Torúpútú and Shengorh, very abundant.

This species is conspicuous from its large size and tumid flat-sided form. I have named it after Lieut. H. Home, R. E., who, with his company of Sappers, rendered so much assistance in clearing the peak on which I first found this shell; and it is with feelings of extreme regret that I have to record the death by sun-stroke a few months after of this able, zealous, fine young officer.

*DIPLOMMATINA LEVIGATUS*, n. sp., Pl. VII, Fig. 7.

Shell dextral, tumidly fusiform, colour pale horny, very smooth throughout, slight close colouration on the four apical whorls. Spire rather rapidly diminishing towards the apex, this is rather sharp in some specimens. Suture moderately impressed. Whorls 7, antepenultimate the largest and swollen, the penultimate constricted in front of the aperture, the last ascends but slightly and is puckered on the posterior margin, corresponding with the angular projections of the outer lip. Aperture vertical; peristome solid, double, the inner lip continuous, circular, the columellar process or tooth moderate, the outer lip with an undulating margin, square below, with angular projections, two below and one on the upper outer margin.

Alt. 0.15 in.

HAB.—The Dikrang valley, Dafla Hills.

This is a very distinct form from any I am acquainted with: the waved margin and angular expansions on the outer lip are its most peculiar characters, and mark at once its distinctness.

*PUPINA IMBRICIFERA*, Bs., var.

HAB.—Dafla Hills. The small variety like that of the Nágá Hills. Only two obtained, the shell appearing to be rare on this side.

*STREPTAULUS BLANFORDI*, Bs., Pl. VIII, A, Figs. 2, 3, & 4.

HAB.—Harmutti, the Tanir ridge, and Dikrang valley; one only from 7000 feet,—an abundant shell in the low ground.

The true typical form ranges from 1000 to 4000 feet as a rule. There are, however, two other forms, one of which has been alluded to by Mr. W. T. Blanford in his paper on the 'Classification of the Cyclostomacea of



Eastern Asia' (Ann. and Mag. Nat. Hist., June 1864), and considered by him to be perhaps worthy of specific distinction; in this (which I distinguish as var.  $\alpha$ ) the internal tube opens in the peristome outwards, with no tendency to form an external sutural tube: of it I obtained three fine specimens on Shengorh Peak, where it was associated with the other forms. In the other (var.  $\beta$ , or var. *tubulus*), which was only obtained in one locality at 5000 feet on the flanks of Torúpútú, there is a still wider departure from *S. Blanfordi*, Bs.; the internal tube passes out just behind the peristome, almost in the same way as in *Rhaphaulus chrysallis*, Bs., and is directed upwards for about 0.05" of an inch. These differences are very remarkable, occurring as they do in distinct species from Malayana, and I should be inclined to consider them worthy of specific titles were the habitats of the two forms wider apart, but both occur together, and in no other point of structure can I detect any constant difference. I at first thought that var.  $\beta$ . was more tumid and depressed and that it had a more developed aperture, but similar continuous, thickened, circular peristomes are to be found among the normal forms, when a large series is examined; and the same holds good of the external shape. I am sorry that I had no opportunity of examining the animals of these three forms: some considerable modification of parts must surely be required to produce the very great differences in the length and direction of this tube-like process near the aperture.

Particularly fine examples of *S. Blanfordi* were found, as much as 0.43 in length and 0.28 in. in diameter.

#### MEGALOMASTOMA PAUPERCULUM, Bs.

HAB.—Shengorh Peak and Torúpútú. This form was found at all the higher elevations, whereas I did not obtain a single example that will assimilate with *M. funiculatum* from Darjeeling, either in form or colouration.

#### MEGALOMASTOMA TANYCHEILUS, n. sp., Pl. VII, Fig. 5.

Shell cylindrical, turreted, solid, pale ochreous, sometimes with a tinge of green, rather strongly and diagonally striated. Spire straight, sides nearly parallel, apex conoidal, suture shallow. Whorls 9, with very slight convexity of side. Aperture vertical, large, and circular, the peristome continuous, very largely developed, thickened, and expanded; at base of the last whorl is a strong keel which terminates above near the centre of aperture. Operculum composed of several horny layers, which appear to be formed slowly and concentrically on a line radiating from the centre to the circumference.

Length. 1.20, diam. 0.35, diam. apert. (peristome included) 0.32 in.

HAB.—Dikrang valley, low down, ranging up to about 2,500 feet and very abundant.



This shell is a much wider departure from the Darjeeling form first described by Benson, *M. funiculatum*, which is so much more tumid, shorter in spire, of a dark purplish brown colour, and never has the peristome so broad and thickened as in this species. *M. pauperculum* is intermediate between the two.

*POMATIAS HIMALAYANÆ*, Bs.

HAB.—Torúpútú and Shengorh Peaks.

*POMATIAS PLEUOPHORUS*, Bs.

HAB.—Very fine specimens were obtained at the village of Pachitah (Camp 7); it was also got at Harmatti. Alt. 0·32, diam. 0·17 in.

*POMATIAS GRANDIS*, n. sp., Pl. VII, Fig. 13.

Shell dextral, perforate, turreted, rather swollen below, solid, with moderately strong close costulation throughout, smooth on the penultimate whorl above the aperture, very close fine ribbing behind the aperture; covered with a thin epidermis; grey corneous or pale ochreous. Spire rapidly decreasing to apex. Whorls 9, slightly convex, the last rounded below. Aperture vertical, circular. Peristome double, thickened, reflected, continuous, slightly angular at upper outer margin. Operculum thin, horny, indistinctly spiral in some specimens.

Alt. 0·55, diam. 0·20, diam. ap. 0·17 in.

HAB.—Shengorh Peak, rather abundant in moss on rocks.

Its very large size distinguishes it at once from *P. himalayana* and *P. pleuophorus*, but it also differs in its more tumid form, the greater number of its whorls, its rounder aperture without the distinct small notch, and in not being so strongly costulated.

---

The three following species were found as far back as 1866-67, while the survey of the Khasi and Garo hill-ranges was in progress. I was in hopes that Mr. W. T. Blanford, who has described so many species of the same genus, would have been able to publish these also, but his hands have been so full since then with the large and very important collections from Abyssinia and Persia made by himself, and more recently with those from Yarkand, together with the ordinary work of the Geological Survey, that they have been laid aside. Of two of them years ago I prepared figures, which are now introduced to complete Plate VIII, A. All three are referred to *Cyathopoma*—a genus which has not before been recorded from this part of India. In form these eastern species assimilate with



some from Southern India; but it is interesting and important to note that as regards the operculum there is a distinct departure, the former having this appendage very similar to some *Alycae* of the same province. I, however, consider them nearer to *Cyathopoma* than to any other genus, and it is not desirable to separate them until something more is known of the animals.

1. *CYATHOPOMA JAWAIENSIS*, n. sp., Plate VIII, A, Fig. 6.

Shell narrowly umbilicated, turbate, covered with a dark umber epidermis. Whorls  $4\frac{1}{2}$ , well rounded, with four well raised longitudinal ribs on the last, three shewing on the whorls above. Spire conical, apex papillate. Peristome simple, lip thin; aperture circular, the lirate ribbing extending up to the peristome so as to give it on the exterior margin an angular outline. Operculum pure white, situated close to the margin of the aperture, deeply concave in front, many whorled, with a small dark spot in the centre.

Alt. 0·07, major diam. 0·06 in.

The animal has long pointed pale tentacles, with the eyes on the upper outer basal margin (fig. 6 *c* having been drawn from a dead specimen, the tentacles are represented in a contracted condition). The labial ribbon (fig. 6 *b*) is very similar to that of *Diplommatina*, all the teeth being five-cuspid in the usual arrangement 3—1—3, with the central rather broad.

HAB.—This little shell is very abundant in the woods close to Jawai among dead leaves, and I found the first specimen close under the Dak bungalow at that place. The very white operculum with the dark central spot contrasting with the dark colour of the shell is a very conspicuous character.

In the Nágá Hills I afterwards obtained a slightly larger form to which the above description would apply, only that the operculum is not so deeply concave and is situated well within the aperture, whereas in several dozen specimens of *Jawaiensis* examined the position of the operculum is external.

2. *CYATHOPOMA NEVILLI*, n. sp., Plate VIII, A, Fig. 5.

Shell elongately turbate, very closely umbilicated, covered with an olivaceous epidermis. Whorls  $5\frac{1}{2}$ , rounded, with four well marked spiral ribs and one basal near the umbilicus. Apex blunt. Aperture rounded, peristome simple, continuous, very slightly thickened and reflected, operculum well within the aperture, slightly concave, minutely multispiral, with a large central plain area.

A very large specimen measures alt. 1·1, major diam. 0·08, but some are only 0·07 in. in alt. Animal not observed.



HAB.—Khási and Nágá Hills, in damp situations among decaying vegetation at about 4000—5000 feet, not by any means abundant. I at first considered it to be a *Jerdonia*, from its remarkable similarity in external form to *J. trochlea*, Bs., from Southern India, but on comparison of the opercula I found a considerable difference. It is a smaller shell than *J. trochlea*.

### 3. CYATHOPOMA GAROENSE, n. sp.

Shell openly umbilicated, turbinate, white, multirate. Whorls 5, well rounded; there are six well marked longitudinal ribs on the last whorl, the interval between the 4th, 5th, and 6th being wider than that between the ribs above. Succeeding these below near the umbilicus can be counted eight very close lines of ribbing; the whole surface between this ribbing is sharply and regularly striate, giving it rather a lace-like appearance. Spire conoid, apex high and papillate. Peristome simple, quite circular, single. Operculum exposed in front close to the margin of the aperture, multispiral, flat in front, thick and shelly in appearance. Animal not observed.

Alt. 0.08, major diam. 0.09 in.

HAB.—It was first taken on limestone rocks in the South Garo Hills, and was particularly abundant at Rywuk on the Sumessary river in the limestone cliff on the left bank of the river; it must extend all along the southern face of the hills with the run of the Nummulitic rocks, for I have two specimens in my collection from the South Jaintia Hills. *C. Garoense* is very like the South Indian *C. Deccanense*, W. Blf., in the sculpture and position of the operculum.

No species of *Cyathopoma* have as yet been obtained anywhere to the north of this line of hills, not one occurred among the large collection of shells made in the Dacca Hills, the most eastern part of the Himalayan range that has as yet been explored.

## EXPLANATION OF THE PLATES.

### Plate VII.

- |      |     |                                                              |
|------|-----|--------------------------------------------------------------|
| Fig. | 1.  | <i>Cyclophorus nivicola</i> , n. sp., nat. size.             |
| "    | 2.  | <i>Spiraculum Nevilli</i> , n. sp., nat. size.               |
| "    | 3.  | <i>Pterocyclos magnus</i> , n. sp., nat. size.               |
| "    | 4.  | <i>Spiraculum hispidum</i> , Bs., sutural tube, nat. size.   |
| "    | 5.  | <i>Megalomastoma tanycheilus</i> , n. sp., nat. size.        |
| "    | 6.  | <i>Diplommatina Homeii</i> , n. sp., enlarged.               |
| "    | 7.  | ————— <i>levigatus</i> , n. sp., enlarged.                   |
| "    | 8.  | ————— <i>Austeni</i> , Blf., large var., enlarged.           |
| "    | 9.  | <i>Alycaeus notatus</i> , n. sp., enlarged.                  |
| "    | 10. | ————— <i>Theobaldi</i> , Bs., var., the operculum, enlarged. |
| "    | 11. | ————— <i>mutatus</i> , n. sp., enlarged.                     |
| "    | 12. | ————— <i>Daccaensis</i> , n. sp., enlarged.                  |
| "    | 13. | <i>Pomatias grandis</i> , n. sp., slightly enlarged.         |



## Plate VIII, A.

- Fig. 1. *Cyclophorus fuscicolor*, n. sp.  
 " 2. *Streptaulus Blanfordi*, Bs. (the shorter line shews the height of the aperture, the longer, the length of shell).  
 " 3. ————— var.  $\alpha$ .  
 " 4. ————— var.  $\beta$ . (*tubulus*).  
 " 5. *Cyathopoma Nevilli*, n. sp.  
 " 6, 6a. ————— *Javaiensis*, n. sp.  
 " 6b. ————— labial ribbon.  
 " 6c. ————— head of animal shewing position of the eyes  
 (the sketch was taken from a specimen after removal from its shell, the tentacles are therefore much contracted).  
 " 7. *Carychium Indicum*, Bs.  
 " 8. ————— *Khasianum*, G-A.

XIII.—*Descriptions of some new Land and Freshwater Shells from India and Burmah.*—By W. THEOBALD.

(Recd. June 4th ;—Read July 7th, 1875.)

(With Plate XIV.)

*SESARA HUNGERFORDIANA*, n. sp., Pl. XIV, Fig. 1.

*Testa lenticulari, imperforata, cornea, confertim transverse striata, ad apicem obtusum et umbilicum circa lævigata. Anfractibus sex lente crescentibus, ultimo acute sive filiforme carinato, et ad aperturam (per anfractus ultimi dimidium) descendente. Apertura fere verticali, marginibus callo tenuissimo junctis. Labio incrassato, dentibus tribus æquidistantibus instructo, dente interiori libero, cæteris callo brevi junctis.*

*Lat. major 11·00, lat. minor (?) 11·00, alt. 5·50 mm.*

*Habitat ad 'Mizan-toung' prope ripas 'Salwin' fluminis provinciæ 'Martaban' haud procul a Maulmein.*

This interesting addition to the *Sesara* group was forwarded to me by Dr. Hungerford from near Maulmein. It recalls *T. Attaranensis*, Th., but differs in its descending last whorl, and in its teeth, which are larger and more equal, whilst the callus uniting the two outer ones is less developed than in that species, in which it constitutes a horse-shoe-shaped fillet. In some specimens the shell may be perforate, as it is a thin callus only which seems spread across the narrow umbilical opening.

*SESARA INERMIS*, n. sp., Pl. XIV, Fig. 2.

*Testa sublenticulari, angustissime umbilicata, depressa, cornea, subpolita, sed supra exilissime transverse striata. Anfractibus septem, ultimo*





*filiforme carinato, non descendente. Apertura fere verticali. Labio subincrassato, sinuato, dentibus nullis instructo.*

*Lat. maj. 11·60, lat. minor. 10·80, alt. 4·80 mm.*

*Habitat in valle fluminis 'Salwin' haud procul a Maulmein provinciâ Martaban.*

The exact locality where I procured this species I do not know, beyond that it was near the Salween. It is interesting as the simplest form of the group to which it belongs, having no teeth and rather feeble striation. Its habit, however, is quite that of a *Sesara*, and it comes from what is almost the headquarters of the group in Burmah.

CORASIA BOURDILLONII, n. sp., Pl. XIV, Fig. 3.

*Testa conoidea, oblecto-perforata, carinata, tenui, polita, albida, translucens, sub epidermide pallide straminea et decidua lineis exilissimis flexuosis spiraliter ornata. Anfractibus 4½, celeriter crescentibus, ad apicem mammillatum paullo convexis, sed ultimo supra planato et circa umbilicum paullo inflato. Apertura magna subquadrata; marginibus simplicibus callo tenuissimo junctis.*

*Diam. maj. 25·4, diam. min. 19·5, alt. 14·8, aperturæ alt. 16·0, ejusdem lat. 14·0 mm.*

*Habitat montibus in umbrosis provinciâ Travankor haud procul a Trevandrum Indiâ Australi, teste F. Bourdillon.*

A few dead examples of this handsome and evidently arboreal species have reached me through the kindness of Mr. Bourdillon, after whom I have named it, and to whom I am indebted for a small collection of shells from the same locality. Among these were *Cyclophorus Niligiricus*, *Cataulus Calcadensis*, *Myxostoma deplanatum*, *Micraulax scabra* n. sp., *Ditropis planorbis*, *Mychopoma hirsutum*, the recently described *Hemiplecta Beddomei*, *Rotula indica* (a large form of 28 mills and a small stout form of 17 mills), *R. Shiplayi*, *Sitala opicata*, a single reversed arboreal *Helix* of the *albizonata* type (*Geotrochus Calcadensis*), a *Glessula* which seems a mere variety of *G. parabilis*, a stouter form with more arcuate columella (probably *G. Deshayesiana*), and a small species not determined, a *Streptaxis*, and *Hapalus Travankoricus*, n. sp.

MICRAULAX, subgenus novum.

*Cyclophori habitu planorbulari, testa sulco brevi intus instructa, operculo?*

MICRAULAX SCABRA, n. sp., Pl. XIV, Fig. 4.

*Testa lato et profunde umbilicata, et sulco haud profundo et valde inconspicuo intus instructa, linea parum elevata externe notato. Anfractibus*





4—4½ *convexis*, ultimo *subinflato*, *celeriter crescente*, et ad *aperturam non descendente*. *Epidermide scabra*, *juxta aperturam corrugata*. *Apertura parum obliqua*, *subcirculari*, *breviter adnata*. *Operculo?*

*Lat. major 14.20*, *lat. minor 12.00*, *alt 6.20*, *aperturæ lat. 6.00 mm.*

*Habitat montibus in umbrosis provinciæ Travankor Indiæ Australi*, teste F. Bourdillon.

This is a very interesting section of the planorbular *Cyclophori*, uniting the *Myxostoma* type with the turbinate *Lagocheilus*. The canal of *Cataulus* is merely, it would seem, a more highly developed and specialised representation of the shallow groove in this species.

#### HAPALUS TRAVANKORICUS, Th., Pl. XIV, Fig. 5.

*Testa turrita*, *anguste umbilicata*, *tenui*, *translucenti-cornea*; *epidermide sericea*. *Anfractibus 5 valde convexis*. *Apertura verticali*, *quadrato-ovata*, *marginibus simplicibus*, *aliquando callo tenui junctis*; *labio ad umbilicum paullo reflexo*.

*Alt. 6.5*, *lat. 3.9*, *aperturæ alt. 2.2*, *ejusdem lat. 1.5 mm.*

*Habitat montibus in umbrosis provinciæ Travankor Indiæ Australi*, teste F. Bourdillon.

It has been suggested that this is nothing more than the young of *Cataulus Calcadensis*, numerous specimens of which were forwarded to me at the same time, but it differs from the young of that species when of the same size, as was seen from numerous examples. Two specimens only of the present form were found, both dead shells, but in fair condition. The form of the mouth is peculiar and the silky lustre of the epidermis also.

#### \* SPIRACULUM BHAMOENSE, n. sp.

*Testa depressa*, *aperto-umbilicata*. *Apice elevatiusculo*, *sutura profunda*, *anfract. 4½ convexis*, ultimo *juxta aperturam parum descendente*. *Epidermide tenui*, *leviter striata*, *vix scabriuscula*. *Colore corneo-albescente*, *fasciâ mediana cincto*, *strigisque castaneis fulguratis picto*, *superioribus latis*, *inferioribus autem (sive subfascialibus) angustis*. *Aliquando unicolore*, *corneo-stramineo*. *Apertura obliqua magna*. *Peristomate duplici*, *intus ad suturam angulato-inciso*; *extra alam linguiformem subtubularem horizontalen adnatam formante*. *Tubulo suturali recurvato ab apertura 3 mm. distante*.

*Diam. max. 11.00*, *diam. min. 8.50*, *alt. 5.50 (-oris diam.) apertura 5.20 mm.*

*Habitat prope Bhamo valle Iravadi Regno Burmanico.*

The nearest ally of this interesting form is *S. Avanun*, W. Bl., which it approaches in the recurved form of its sutural tube, but it differs in size and mode of colouration. In *S. Avanun*, too, the linguiform projection of





the peristome is vertical, not as in the present species horizontal. The colouration, too, is peculiar, the fulgurate stripes above the peripheral band being much more open or more obtusely bent than in the narrow or more acutely angled bands below it.

SPIRACULUM BITUBIFERUM, n. sp.

*Testa depressa, late umbilicata, apice depresso, sutura profunda, anfract. 5 convexis, ultimo prope tubulum paullo ascendente, inde descendente. Epidermide scabriuscula spiraliter striata; colore albido, transverse vix subfulgurate castaneo strigato. Perist. simplici, expansiusculo, recurvato, prope suturam alam formante, tubulo brevissimo sursum spectante instructo. Tubulo suturali recurvato ab apertura 8 mm. distante. Apertura obliqua.*

*Diam. max. (peristomate incluso) 18·30, diam. min. 14·00, alt. 7·00, apert. 7·80 mm.*

*Habitat prope Bhamo cum precedente.*

This remarkable species differs from most others in possessing a distinct tubular wing at the mouth which somewhat recalls the same feature in *Pt. Albersi*, only the tube is more free and open. The only other species possessing a second tube is *S. Mastersi* figured in the Conch. Indica, Pl. V, Fig. 1, but not described. In that species, however, the last whorl towards the mouth is free and the peristomial tube less complete though longer than in the present form.

STREPTAXIS BOMBAX, Bs., Pl. XIV, Fig. 6.

I give an excellent drawing of this species kindly furnished to me by Mr. W. T. Blanford. The species was originally described as *Helix bombax* from an immature specimen. The adult now figured was from the vicinity of Maulmein.

AMPHIDROMUS THEOBALDIANUS, Bs., Pl. XIV, Fig. 8.

A figure is here given of a perfect example of this rare shell, which was described by Benson from an imperfect example.

GEOTROCHUS CALCADENSIS, Beddome, Pl. XIV, Fig. 7.

I also figure a specimen of this species (Beddome, J. A. S. B. 1870, p. 18) forwarded to me by Mr. Bourdillon from Travankor. It is slightly smaller than the type, measuring alt. 20, diam. major 14·80, minor 12·80, aperturæ alt. 11·00, ejusdem lat. 8·00 mm.

UNIO FOOTEI, n. sp., Pl. XIV, Fig. 9.

*Testa elongata, rotundato-quadrata, valde inæquilaterali ab umbonibus angulata, et infra et antice valde compressa, concentrice striata et postice*





*radiatim striata. Dentibus cardinalibus fortibus, in callo costiformi positus, in valva dextra duobus alteraque singulis, subverticalibus. Cicatricibus valde depressis. Pallii impressione valde conspicua.*

*Diam. maj. 97, minor 40, crass. 25 mm.*

*Habitat in Kistna flumine prope 'Gutparba falls,' teste A. B. Foote.*

This shell has its valves divided into two subequal areas by a strong ridge running back and down from the beaks. The lower and anterior portion is strongly compressed, simulating the appearance of *Arca subtorta*, though there is no true 'version' in the valves. The strong cardinal rib which supports the cardinal teeth is also a marked feature of this species, as well as its radiating striae intersecting the concentric lines of growth. Unfortunately the beaks are much decayed in my two specimens and their sculpture wholly effaced.

I am indebted to my colleague Mr. Foote for both shells collected by him at the 'Gutparba' falls.

#### PISIDIUM BOMBAYANUM, n. sp.

*Testa subovali, tumida, tenui, inæquilaterali, postice rotundata, viz truncata; antice rotundata elongata; exilissime et confertim concentrice striata; dente cardinali minutissimo; dentibus lateralibus in valva dextra geminis, in sinistra autem singulis.*

*Lat. 4.30, alt. 3.70, crass. 2.70 mm.*

*Habitat in Indiæ occidentalis regione "Western Ghats" dicta, teste W. T. Blanford.*

I have long had specimens of this shell from Western India, and it is the same as that mentioned by Mr. Nevill when describing his *P. Clarkeanum* (J. A. S. B., 1871, Part II, p. 9, Pl. I, Fig. 4.). The subangulation mentioned by Nevill is more discernible in young shells than in adults, which are symmetrically rounded. This species is extremely closely allied to *P. Clarkeanum*, but is more convex posteriorly. By an inadvertence of the describer the posterior side of *P. Clarkeanum* is described as the longer instead of the anterior as correctly shown in the figure.

#### PISIDIUM NEVILLIANUM, n. sp.

*Testa trigona, tumidiuscula, tenui, inæquilaterali, postice modice convexa, antice elongata, subacuminata, exilissime concentrice striata; umbonibus lævigatis.*

*Lat. 3.60, alt. 3.50, crass. 2.20 mm.*

*Habitat prope Rurki.*

A single specimen only of this species was communicated to me by Mr. G. Nevill. Its trigonal form most readily distinguishes it from its allies.





PISIDIUM ATKINSONIANUM, n. sp.

*Testa subovali, vix tumida, inæquilaterali, antice elongata, utrinque rotundata, tenui, pallide cornea, concentricè striatula, et lineis paucis (4—5) incrementi fortioribus signata.*

*Lat. 3.30, alt. 2.70, crass. 1.80 mm.*

*Habitat ad Tonglu in Sikkim ad 10000 ped. alt., teste W. S. Atkinson.*

Compared with *P. Bombayanum* this is a smaller, flatter, and less inæquilateral shell. My specimens were given me by Mr. H. F. Blanford, who received them direct from the discoverer.

XIV.—*Descriptions of new Species of Blattidæ belonging to the Genus Panesthia.*—By JAMES WOOD-MASON.

PANESTHIA MONSTRUOSA, n. sp.

Ingens, aptera, aterrima, nitida. Corpore crassissimo. Tegumento valde indurato. Pronoto in maribus valdissime, in fœminis modice, inæquali et impresso; bituberculato; incisura profunda, lata, medio-recta et linea elevata marginata, lateribus cornigera, cornubus in mare magnis, in femina modicis, reflexis, apice plicatis. Abdominis segmentis basalibus infraque supraque sparsim minute punctatis, ultimo laminaque supraanali punctis crebrioribus necnon grandioribus conspersis hac postice 5-dentata. Pedibus validis, spinis tibialibus fortibus armatis; femoribus anticis trispinosis. Long. corporis maris 58 mm.; pronoti  $14\frac{1}{2}$ , pronoti lat.  $19\frac{1}{2}$ , incisuræ lat. 6; mesonoti long. 9, mesonoti lat.  $21\frac{1}{2}$ ; metanoti long. 8, metanoti lat. 23; abdom. long. 30, abd. lat. (ad medium) 23. Long. corp. fem. 52.

HAB.—A male and a female from Southern India (R. C. Beddome).

This fine insect offers a curious resemblance to the *Gromphadorhina portentosa*, Schaum, from Madagascar.

PANESTHIA WALLACEI, n. sp.

Aterrima, nitidissima. Pronoto ut in *P. morione* sed nitidiore et distinctius crebriusque punctato. Abdomine sparsim punctulato, punctis apicem versus sensim frequentioribus ac paullo majoribus; segmento ultimo marginibus integro angulisque posticis vix producto; lamina supraanali disco parce fulvo-pilosa, postice rotundata, tota integra, dentibus lateralibus nullis; lamina subgenitali confertim grosse punctata. Cercis tumidis, fulvo-pilosis. Tegminibus alisque pæne ut in *P. morione*; abdominis apicem longe superantibus; venarum omnium parte apicali perspicua utrinque pallida, subhyalina; illorum vena anali recta impressa hyalina. Femoribus anticis basin versus bidentatis. Long. corporis maris,  $36\frac{1}{2}$  mm., pronoti  $9\frac{3}{4}$ , pronoti lat. 14, long. tegminum 40, alarum 35, abdom. 18, abd. lat. (ad medium) 16.



HAB.—A single male from Sinkep Island, near Singapore.

PANESTHIA FLAVIPENNIS, n. sp.

Aterrima, nitidissima, pulcherrima. Pronoto antice granulato, postice medio sparsim, ad latera confertissime, punctato; aliter ut in *P. Javanico*. Oculis maculisque ocelliformibus flavidis. Tegminibus lætissime flavis, singulis maculis duabus nigris, una parva ad basin, alteraque magna orbiculari pone medium posita, notatis; vena anali elevata potius quam impressa, fortiter arcuata; abdominis segmenti ultimi apicem vix attingentibus. Alis apice flavo-marginatis. Antennis apicem versus flavido-annulatis. Abdominis segmentis dorsalibus punctatissimis; ultimo laminaque supraanali punctis grossissimis: hac margine postico 5-dentata, angulis lateralibus latis: illo angulis posticis acutissime producto; segmentis ventralibus latere punctatis, medio vix punctatis; lamina subgenitali conspicua, lævi, politissima, convexa. Femoribus anticis muticis. Larvis totis aterrimis. Long. corporis ♂ 37—45, ♀ 43 mm.; pronoti ♂ 10—13, ♀ 10½; pronoti lat. ♂ 14½—17½, ♀ 16½; long. tegminum ♂ 29—53, ♀ 29½.

HAB.—Numerous adult and immature specimens of both sexes from the Nágá Hills (J. Butler and Godwin-Austen), Brahmaputra Valley (A. W. Chennell), and Dikrang Valley (Godwin-Austen).

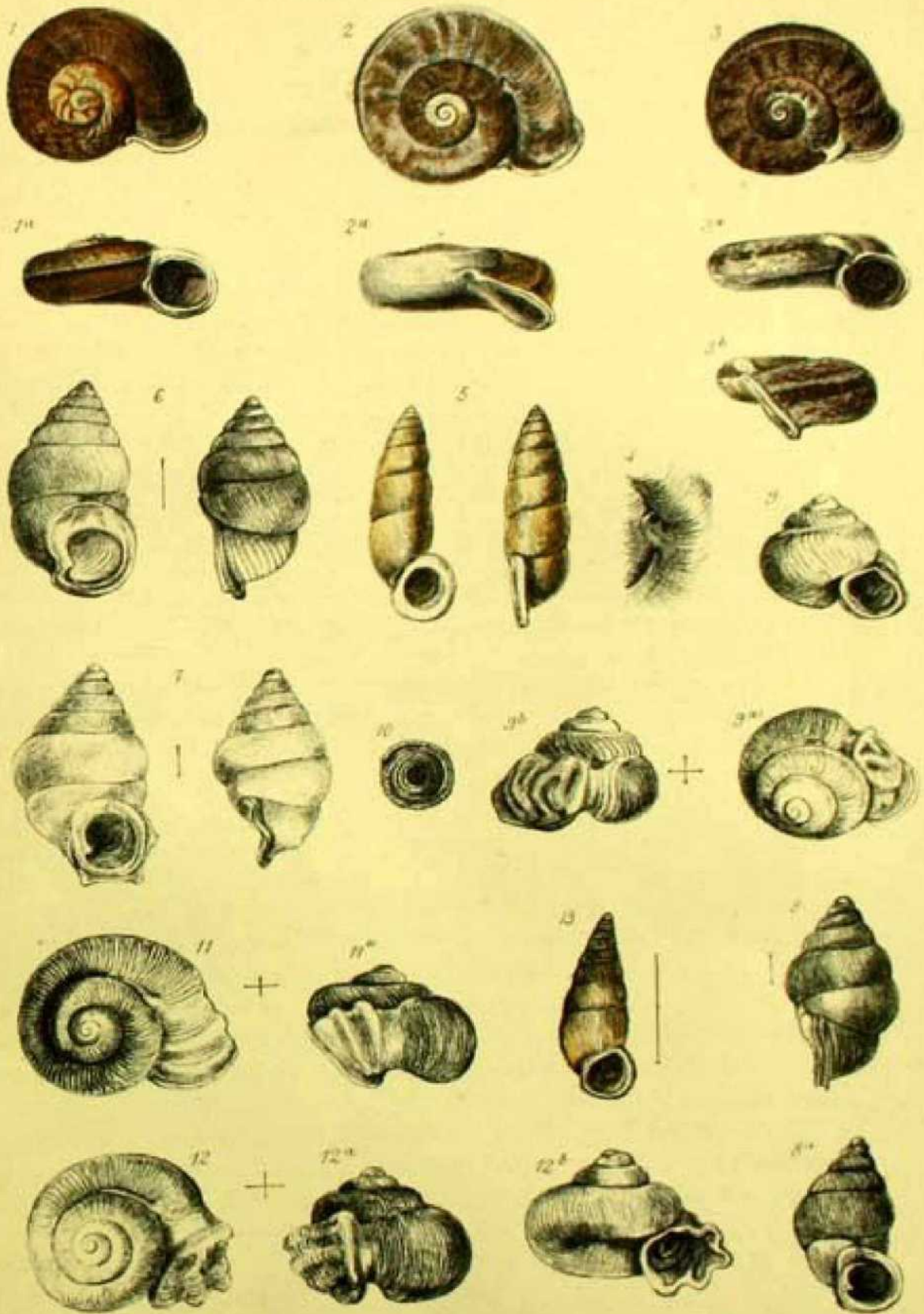
PANESTHIA SAUSSURII, n. sp.

♀ *P. mandarina*, Saussure, *Mélanges Orthopt.*, p. 100, Pl. 3, Fig. 23, non p. 40, Pl. 1, Fig. 25.

I have recently received from Johore in the Malay Peninsula a fine series of specimens of *P. mandarina*, none of which exhibit the least approach to the remarkable structure of the abdomen seen in the insect described and figured by De Saussure as the supposed female of it. The larvæ of *P. mandarina*, moreover, are jet-black throughout, while those of *P. Saussurii* are deep black-brown symmetrically variegated with pale testaceous on every part of the body, including the legs, which are ringed, the antennæ, which are tipped, and the head, which is triply banded, with the same colour. A further reason for refusing to accept the insect figured by De Saussure on Pl. 3 (*op. supra cit.*) as the female of the one represented on Pl. I is, that the latter is itself also a female, the sides of the pronotum in the true males of which are produced into huge curved horns each separated from the broad semioval median lobe covering the head by a deep rounded emargination.

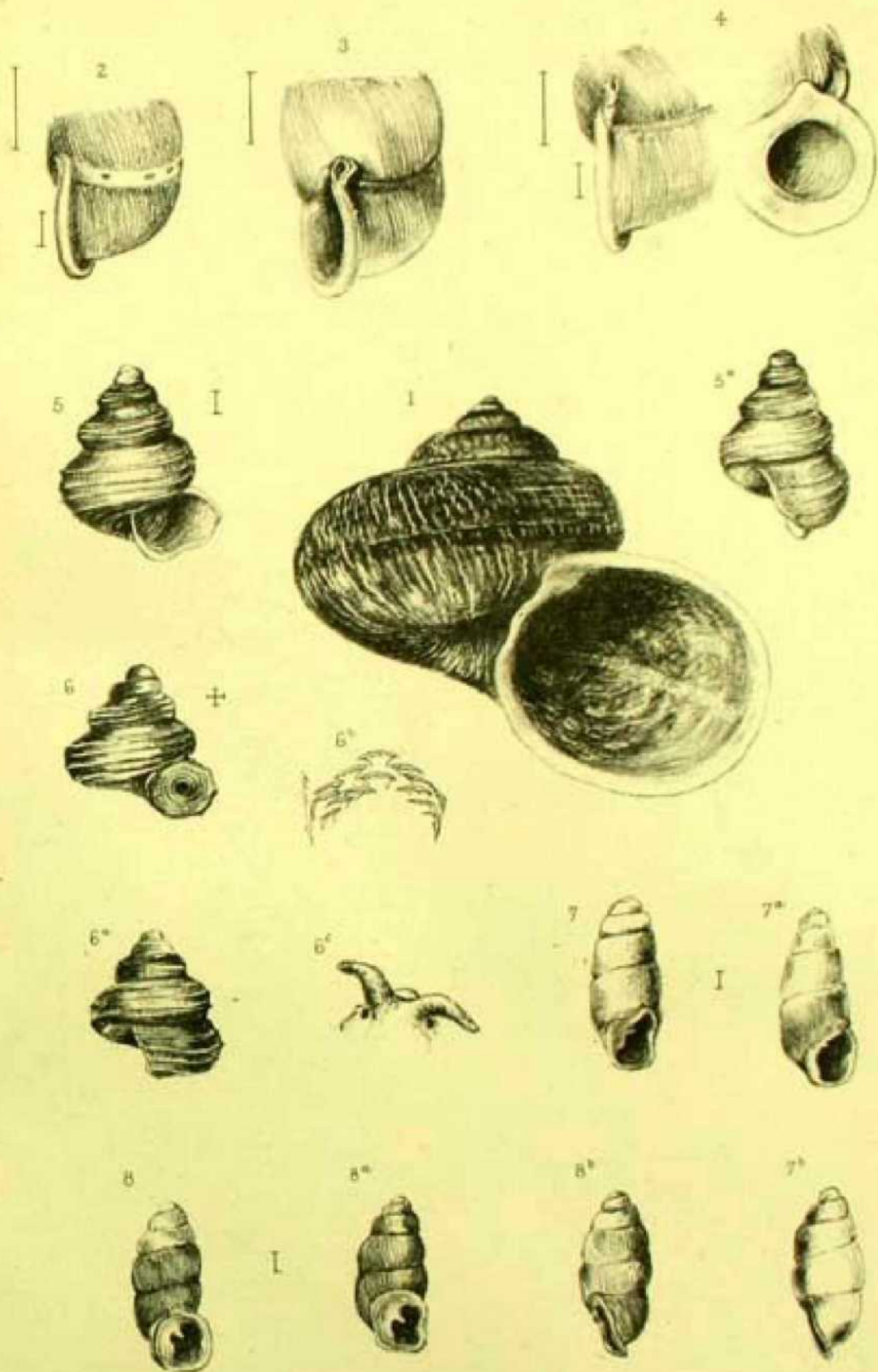
HAB.—A single specimen of the male from Sikkim (L. Mandelli). This insect having been captured just prior to the last moult, the organs of flight are still in rudiment, and the pronotum is still non-emarginate.





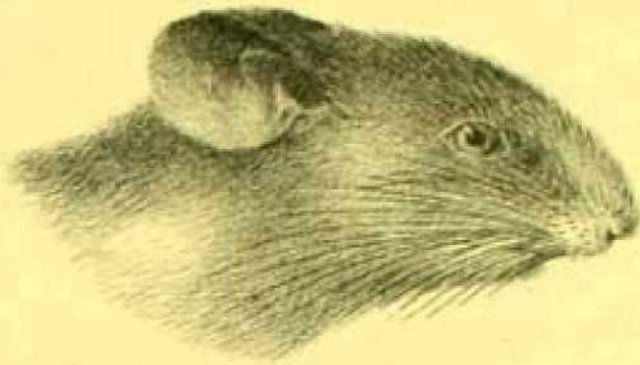
CYCLOSTOMACEA DAFIA HILLS ASSAM.





KHASI AND DAPLA HILL SHELLS.





1.



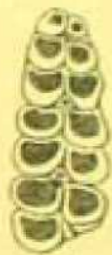
2.



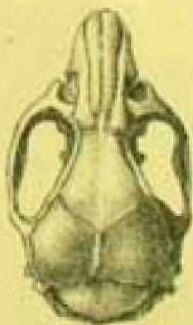
3.



4.



5.



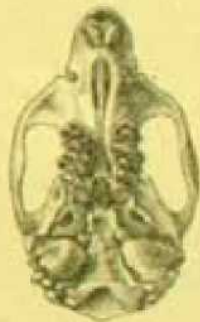
6.



7.

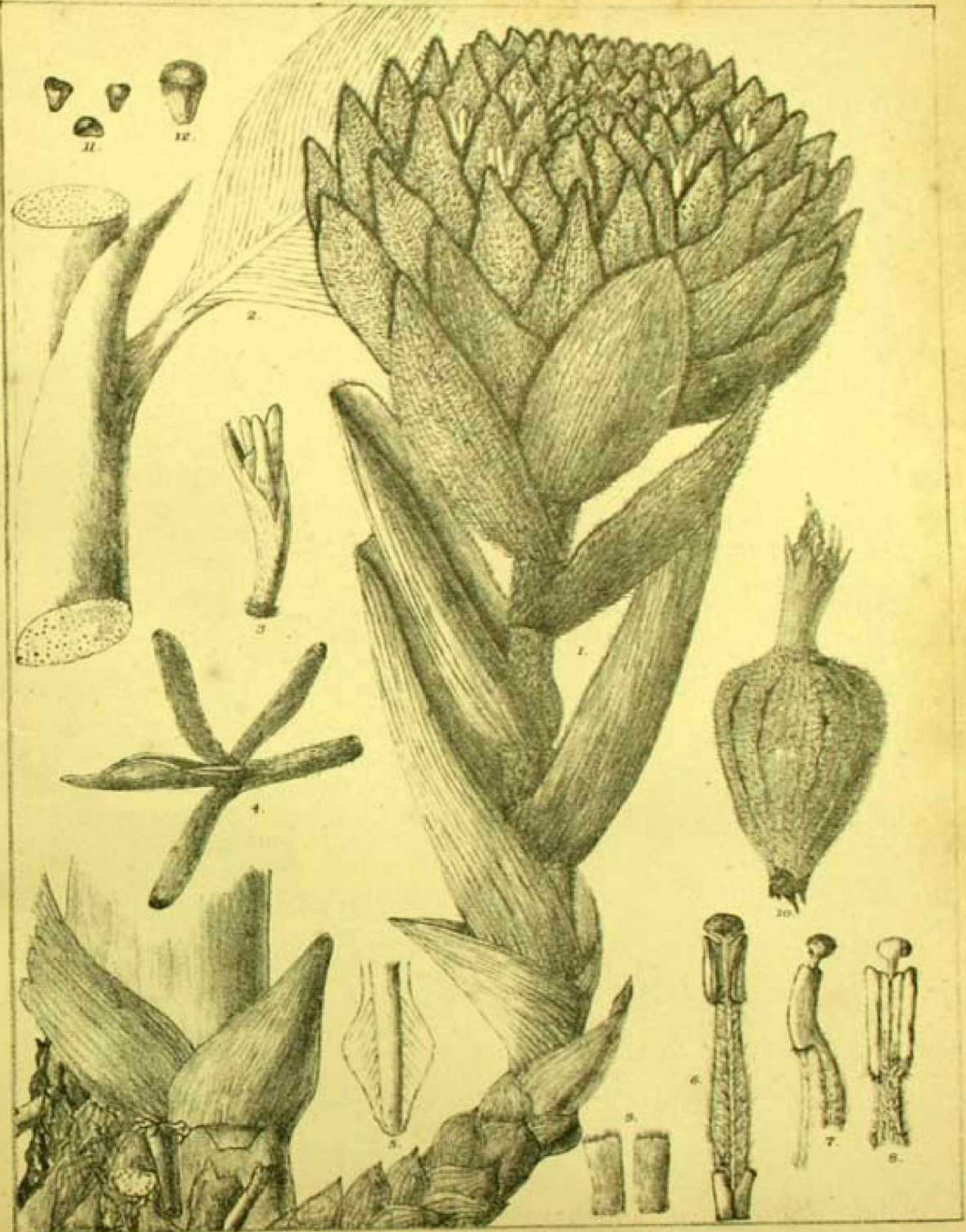


8.



9.





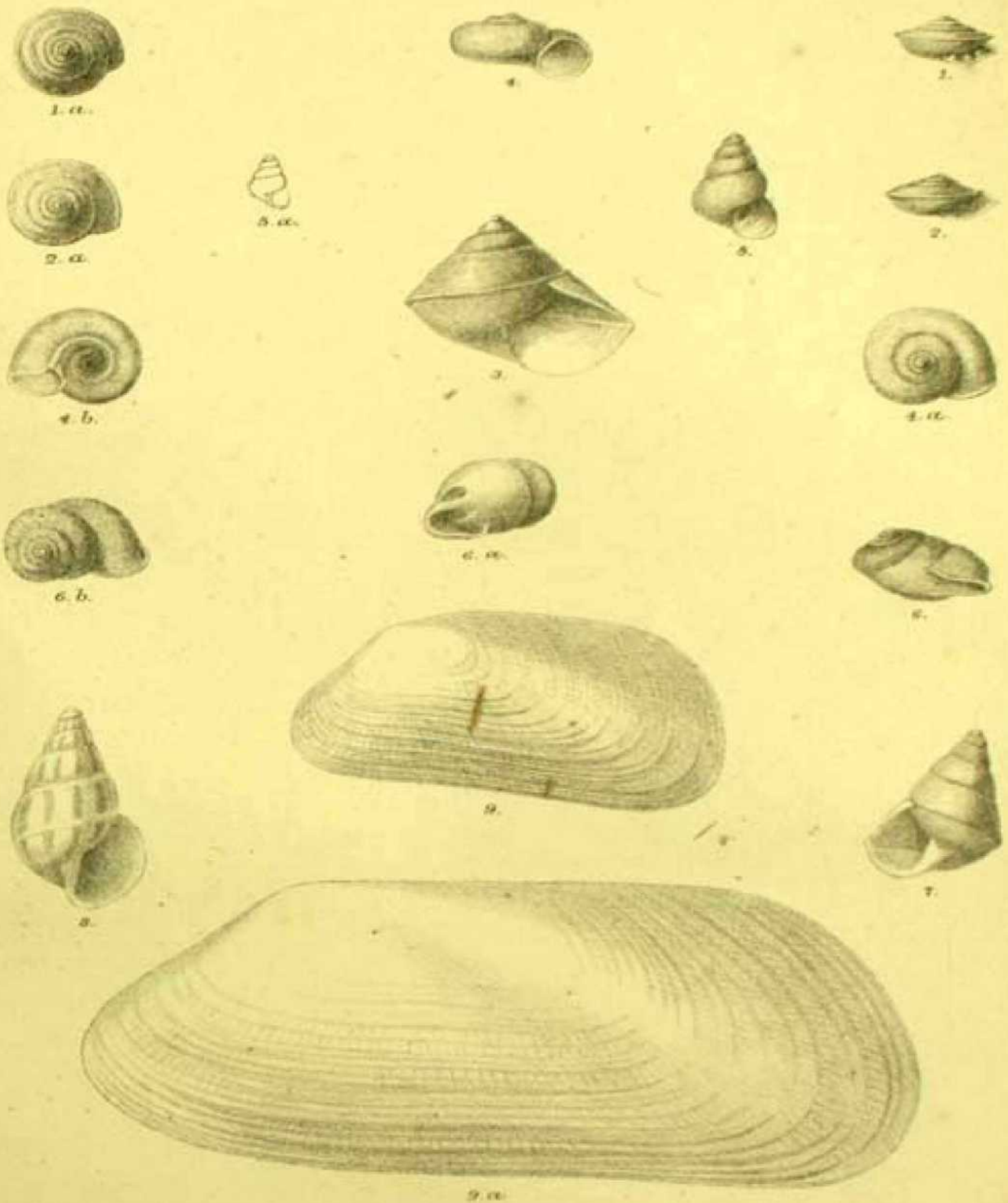




S. Kurz, Lith.

FIG. 1-7. TRICHOGLOTTIS QUADRICORNUTA.  
FIG. 8-12. EULOBELIA DECIPiens.







# JOURNAL

OF THE

## ASIATIC SOCIETY OF BENGAL.

### Part II.—PHYSICAL SCIENCE.

#### No. IV.—1876.

XV.—*Fifth List of Birds from the Hill Ranges of the North-East Frontier of India.*—By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S., Deputy Superintendent Topographical Survey of India.

(Recd. September;—Read Dec. 6th, 1876.)

(With Plates V, VI, & IX.)

The present list includes birds principally from the Manipur Hills, obtained by Messrs. Ogle and Robert in the field season of 1873—74, by Mr. A. W. Chennell in the Eastern Nágá Hills, and by myself in the Khási Hills in 1875. The above-named members of No. 6 Topographical Survey Party deserve not only my best thanks but those of all interested in ornithology for devoting so much of their spare time to this branch of natural history. Mr. Robert in particular has added a number of new species by his zeal in collecting, and I am glad his name is now associated with one of the most interesting of the birds discovered, *viz.*, a *Sphenocichla*. All the new forms were described in a joint paper by Viscount Walden (now Marquis of Tweeddale) and myself, published in 'The Ibis' in 1875, but I have given the descriptions again in full. During the past winter (1875—76), Messrs. Ogle and Chennell have made another collection in the Nágá Hills, and we may therefore expect a few more novelties, as new country on the eastward has been penetrated and surveyed, and for this purpose many of the higher peaks were ascended and cleared. The people (Nágás) have been most hostile throughout the season, and as it must have been almost impossible for the shikaris to be much about by themselves in the jungle, I do not anticipate a very large collection.



The addition of the following 36 species brings up the record from the eastern districts and hill-frontier to 528 species, a number which, with so many zealous collectors in the party, I trust will be still further augmented before the survey is completed.

16. *HYPOTRIORCHIS CHICQUERA*, Daud.

From Sylhet.

18. *ERYTHROPUS (CERCHNEIS) PEKINENSIS*, Swinhoe.

This specimen was submitted for identification to Mr. Gurney, who says it is too immature in plumage to enable him to decide whether it is really the above or the European species, and who, moreover, doubts the validity of *E. Pekinensis*. But as birds from the Nágá Hills are far more likely to be similar to those from China, I have given it Swinhoe's title, following Jerdon in his 'Supplemental Notes to the 'Birds of India'' in 'The Ibis' for 1871.

25. *ACCIPITER VIRGATUS*, Temm.

Obtained by Mr. Chennell near Debrughur.

41a. *POLIOAETUS PLUMBEUS*, Hodgson.

I have a fine specimen, evidently a female, from the Nágá Hills, agreeing with Dr. Jerdon's description in his Supplementary Notes (*op. supra cit.* p. 336). This was sent for identification to Mr. Gurney, who in reply says—"The one marked *humilis* is *plumbeus* of Hodgson, which I think must be admitted as a good species." Mr. Sharpe, in his 'Catalogue of the Accipitres', does not recognize *P. plumbeus*, but places it as a synonym of *P. ichthyactes*, considering Hodgson's drawing an unfinished picture of the large species; but Hodgson surely would not have omitted, even in an unfinished drawing, the broad white bar on the tail, the colouration of the tail being the most important character both in *P. humilis* and *P. plumbeus*.

The description of the bird now recorded will run as follows:

On back and shoulder of wing pale umber-brown, with ash-coloured feathers coming in on the centre of back; the tail is of the same colour but darker, increasing in intensity to the end, with no white save at the very roots of the rectrices. Head hoary grey, passing into ashy brown on the nape, with an admixture of some pure plumbeous feathers. The primaries are very dark umber-brown, some of the larger coverts splashed with a more rufous paler brown, the traces of the previous phase of colouration; the first



and second are inside slightly mottled with white on the inner web. Side of head and the chin ashy, passing into hair-brown on the breast. Thighs, abdomen, and under tail-coverts pure white. The lower back has vinous reflections in certain lights.

I have been able to compare this fish-eagle with a male of *P. humilis* from Malacca, and although the plumage is almost identical, save for the greyer tint of the latter, the difference in size is more remarkable. The Nágá bird is in point of size of wing and tail nearly equal to *P. ichthyactis* but with far feebler bill and talons. *P. plumbeus* would appear to be the more robust Indian representative of the smaller Malayan *P. humilis*.

94. CHELIDON NIPALENSIS, Hodgson.

From Konchungbum.

135b. ALCEDO BEAVANI, Walden.

Comparing a very large series of *A. Asiatica* (= *Meninting*, Horsfd.), *A. Moluccensis*, and *A. Beavani*, the distinctly rich lazuline tint of the upper surface in *A. Asiatica* is most apparent. In *A. Moluccensis* and *A. Beavani* this blue has a greenish tinge of torquoise, while beneath *A. Beavani* has the rich sienna-brown of *A. Asiatica*. Such slight differences of colour as those mentioned above are very subtle, but, though in many forms they are very constant when a number of birds are placed side by side, it is quite impossible to settle such fine points of divergence by comparison with coloured plates, as, I notice, is occasionally done. My specimen was obtained on the Sussa river, near Debrughur.

W. 2.67 inches, T. 1.2, F. 0.35, Bf. 1.7.

It agrees exactly with specimens from Cochin China in Lord Walden's collection.

I have examined 23 skins of *A. Asiatica* from the following places, Eastern (Soerabaya) and Western Java, Sarawak, Malacca, Lombok, Togian Islands, Marúp, Penang, Labuan, and Macassa; 6 specimens of *A. Moluccensis*, from Cebebes, N. Ceram, Jololo, and Amboyna (type); and 6 examples of *A. Beavani* from Sadya, Debrughur, the Andamans, Manbaum, Burmah, and Cochin China.

160a. PICUS ATRATUS, Blyth.

A specimen of this woodpecker obtained at Thingra in the Munipur Hills agrees with Burmese examples. It has been lately figured by Lord Walden in the 'Ibis' for July 1876, in his interesting notes on the late Colonel Tickell's fine series of excellent and truthful drawings of Indian birds, which, with the MSS., have been presented to the Zoological Society of London.



160*b*. PICUS MANDERINUS, Gould, var.

This species has for its nearest ally in these districts *P. majoroides*, but the outer tail-feathers are white with narrow black bars, in contradistinction to *P. majoroides*, in which they are black with broad white ones.

Above it is the counterpart of *P. majoroides*: the back, wing, and tail rich velvety black; spots on the wing-feathers moderate; a very large and conspicuous white wing-patch formed by the secondary coverts; a scarlet band on the nape; a white frontal band extends through the eye to the ear-coverts and side of the neck, the portion near base of bill and the ear-coverts being pale flaxen. Beneath: the chin white; throat and upper breast earth-brown, with a pale scarlet gorget bordering a black patch, which, commencing at the gape, widens and extends down the side of the neck, a few pure white feathers separating this from the earth-brown of the throat; flanks white; the tail has the two outer feathers white, barred with black on inner web, the outermost has two spots on the white outer web, and in the penultimate this web is entirely white; tips of the four outer tail-feathers ferruginous; the abdomen and under tail-coverts are crimson. Bill dark plumbeous, rather stouter and blunter than that of *P. majoroides*; legs equal in size.

L. about 8 inches, W. 5.0, T. 3.68, t. 0.85, Bf. 1.17.

HAB.—Was obtained by Mr. Wm. Robert at Gonglong, Manipur Hills.

It differs from *P. manderinus*, Gld., in being smaller, in the white on the wings being more conspicuous, in being browner on the throat and breast, and in its whiter tail. In the specimen of *P. manderinus* in the British Museum with which I compared it, the outer web of the penultimate tail-feather has a black spot.

238*a*. DICEUM OLIVACEUM, Walden.

A specimen from Samaguting turns out to be identical with those from Tonghu, Burmah. Blyth must have been mistaken when he says he saw *D. minimum* in abundance at Moulmein: the species he saw must have been either *D. virescens* or *D. olivaceum*, probably the former.

## 245. CERTHIA DISCOLOR, Blyth.

L. about 5.75 inches, W. 2.54, T. 2.9, t. 0.60, Bf. 0.58.

Naga Hills.

## 248. SITTA HIMALAYENSIS, Jard. and Selby.

Aimul, Manipur Hills.

There are several skins in the collection. Interesting as being the first record of this nut-hatch so far to the eastward.

W. 3.0 inches, T. 1.70, t. 0.65, Bf. 0.60.



303. *CYORNIS UNICOLOR*, Blyth.

This bird, hitherto only obtained in Sikkim, I have from the Khasi Hills. Among Col. Tickell's drawings there is one of this species under the title *Eumyias melanops* (*vide* Lord Walden in op. supra. cit., p. 353), shewing that it extends southwards into Akyab.

317. *ANTHIPES MONILIGER*, Hodgson.

Gonglong, Manipul Hills.

332a. *PNOEPYGA ROBERTI*, Wald. and Aust.

The following is the original description of this species published in 'The Ibis' for 1875, p. 252.

"Above olive-brown, each feather pale-centred and fringed or tipped with dark brown. Lores albescent. Between the eyes and the rictus black. A well-defined streak extending from above the eye down each side of the head, fulvous. Ear-coverts cinereous at base, brown towards the tips. Chin and throat pure white, each throat-feather being terminated by a small black triangular drop; as the tips of the feathers overlap, these drops form continuous black lines, the two principal ones descending from the angles of the under mandible. Cheeks ferruginous, each feather with a black terminal drop. Pectoral and abdominal feathers pale brown, with broad pure white or fulvous-white centres. Under tail-coverts bright ferruginous yellow. Plumage on the rump loose, soft, and dense, completely concealing the short tail, and being of an almost uniform ferruginous brown colour. Wings when closed, dark chocolate-brown, most intense on the secondaries. Most of the wing-coverts distinctly tipped with almost pure white, so also the inner tertiary quills. Rectrices chocolate-brown."

"Bill from nostril 0·37 inch, wing 2·15, tarsus 0·75, tail 1·15."

This bird was found at Asalú and also at Chakha in the Manipur hills. In my first list it is recorded under the name of *Pnoepyga caudata*, Blyth. It closely resembles *Turdinus brevicaudatus*, especially in the upper plumage, but may be at once distinguished by its smaller size and diminutive tail.

332b. *PNOEPYGA CHOCOLATINA*, Wald. and G-Aust.

Described in 'The Ibis,' Vol. V, 1875, p. 252, as follows:—

"Above olive brown, each feather fringed with a somewhat fainter tint, thus imparting a subdued scaly aspect to the back. Wings and tail chocolate-brown. Upper and under tail-coverts ferruginous brown, brightest on the under coverts. Lower surface generally ferruginous brown, many of the abdominal feathers being largely centred with white or fulvous white. Pectoral feathers with minute terminal white drops, or some with narrow





white or fulvous white centres. A few almost white feathers on the middle of the breast. Chin white; gular feathers white, with pale fulvous or ferruginous edges. Bill dark brown. Legs pale flesh-colour."

"Bill from nostrils 0·25 inch, wing 1·87, tarsus 0·75, tail 1·75."

"Described from a specimen obtained at Kedimai in the Manipur Hills."

Having obtained specimens of this bird at Shillong in June 1875, I can add a few additional notes from birds in the flesh. The specimen first described is evidently in an immature stage of plumage. In the adult, the lores are pale over the eye also, the border of lower mandible is white, the under surface is more rufous, there is no sign of white tippings to the breast or abdominal feathers, the irides are red-brown, and the legs pale horny.

In the Jardin des Plantes at Paris, where Mr. Oustalet very kindly got out for my inspection the fine series of birds collected by Père Armand David in Moupin, Setchuan, &c., there is a *Pnoepyga* very close to this form, the *P. Halsneti* of A. David, which is speckled all over with whitish on a pale umber-brown, has a pale rufous moustachial streak, a white throat, and a finely barred tail.

335. *RIMATOR MALACOPTILUS*, Blyth.

Manipur Hills.

362. *MERULA ALBOCINCTA*, Royle.

Remta, Manipur Hills.

W. 5·65 inches, T. 4·1, t. 1·5, Bf. 0·78.

367a. *TURDUS PALLIDUS*, Gmelin.

375. *PARADOXORNIS RUFICEPS*, Blyth.

Hemeo Peak, North Cachar.

377. *CHLENASICUS RUFICEPS*, Blyth.

Baladhan, Cachar.

378a. *SUTHORA MUNIPURENSIS*, G-Austen and Walden.

Described in 'The Ibis' for 1875, p. 250 as follows:—

"Crown of head cinnamon-brown, becoming more olivaceous or fulvous green on back; shoulder of wing greenish umber. Primaries black, the first four edged white, the rest crossed with a bright fulvous bar on the outer webs; the secondaries edged broadly with fulvous, and a few of the last tipped white on inner web. Tail ruddy fulvous at base, paling towards the end, which is dusky and indistinctly barred, a broad supercilium





black, lores and narrow circle round the eye pure white. Ear-coverts and side of neck grey; chin and throat black, merging into pearly grey and white on the breast; under tail-coverts pure white."

"Length 4.5 inches, wing 1.8, tail 2.4, tarsus .77, bill at front 0.28."

This is another fine species discovered by Mr. Wm. Robert, near Kara-Khul, in the Munipur Hills. Several more specimens were shot in the following field-season by Mr. Chennell, in the Eastern Nágá Hills. A second species very close to it was discovered by myself in the Dafla Hills, and named *S. Daflaensis*. This may be known by its smaller size, far brighter crown, and grey chin instead of the jet black one of *S. Munipurensis*.

386a. *PYCTORHIS ALTHIOSTRIS*, Jerdon. Plate IX.

I have alluded to this species in my 'List of Birds from the Dafla Hills.' There is I find a specimen among the birds collected the same season by Mr. A. Chennell in the neighbourhood of Sibsagar. For some time I failed to discover what had become of the type, but, Mr. Sharpe having since found it in the British Museum and very kindly called my attention to it, I have been enabled to compare my specimen. I do not hesitate to pronounce the two the same, although Dr. Jerdon's specimen is somewhat different in colouration, being whiter on the chin and upper breast; it is, however, paler throughout and appears to me to have faded considerably, having all the appearance of having been packed in a damp state, with perhaps some carbolic powder. Some skins of mine that got damp in transit to Calcutta, I noticed, lost much of their brilliancy. The dimensions are the same.

This bird ought to be found again in the high grass of upper Burmah, and no doubt would be found, if zealously looked for.

388a. *ALCIPPE FUSCA*, n. sp.

Above—head and nape dull grey; back olivaceous ochre, richer and more ochraceous on the rump. Tail umber-brown edged with the same colour as the back. Wing rich ochry brown, fulvescent ochre inside as well as on the flanks and thighs. Ear-coverts dull brown, chin sullied white. Bill and legs horny. Irides?

L. about 5.75 inches, W. 2.85, T. 2.7, t. 0.87, Bf. 0.47.

The above dimensions taken from skin.

HAB.—Four specimens were obtained by Mr. A. W. Chennell in the Nágá Hills.

Having remembered to have seen a very similar bird in the Jardin des Plantes, I forwarded a specimen to M. Oustalet, who very kindly examined it and gave me the following particulars:—It has a strong likeness to an *Alcippe* from Fokien named by M. A. David, *Alcippe Hueti*;





the tint of the head, back, and abdomen are nearly the same, but there are differences worthy of notice. 1st, *A. Huetti* has the bill decidedly shorter than *A. fusca*, 11 millims. instead of 13, taking the measurement along the culmen, and 14 instead of 18, from the gape; the tarsus having the same dimensions in the two birds. 2ndly, the chin and the upper part of the breast are pure grey, and not pale fulvescent (*fauve clair*), as in *A. fusca*. 3rdly, the tint of the flanks is less fulvescent ochre, more mixed with green. 4thly, the internal webs of the tail-feathers are scarcely darker than the external, instead of being blackish as in *A. fusca*. Lastly, the wing is shorter, 0.65 mill. against 0.72 mill. M. Oustalet is of opinion that the two are quite distinct though closely allied, *A. Huetti* being nearer to *A. Nipalensis*. Another close form is *A. Morrisonia* from Formosa, which differs in being more rufous above, grey-cheeked, and smaller.

391a. SPHENOCICHLA ROBERTI, Wald. and G.-Aust. Plate VI.

The original description in 'The Ibis' for 1875, p. 251, is as follows:—

"General colouration throughout dark umber-brown, richer on the wings and tail, which are closely barred with black; feathers of the nape and back edged with darker brown, and with an inconspicuous pale spot near tip; these spots are more defined on the side of the neck. The feathers of the throat, neck, and breast are lanceolate, with a white edging showing as V-shaped markings; towards the abdomen these become less conspicuous, and only a few white spots dot the flanks. Bill grey, pale beneath and at tip."

"Length about 6.5 inches, wing 2.8, tail 3.0, tarsus 0.93, bill at front 0.87, depth at base 0.40.

"Shot on Hemeo\* Peak, North Cachar hills, and also in the Manipur Hills."

A second species of this new genus from the Nágá hills was a highly interesting prize, and it is one of the finest things for which we are indebted to Mr. Wm. Robert. The form from the Darjeeling hills is quite distinct: is a much smaller bird, without any V-shaped markings on the side of the neck and breast, and of a different tint of brown; the bill, moreover, is not so compressed and wedge-shaped above—a character that links it to *Stachyris nigriceps*, which in its dark coloured head approaches the same kind of colouration.

406. XIPHORHAMPHUS SUPERCILIARIS, Blyth.

Konchungbun Peak, Manipur Hills. Similar in every respect to the Darjeeling bird.

\* *Hemes* by mistake in the 'Ibis.'



498. *RUTICILLA HODGSONII*, Moore.

From the Eastern Nágá Hills.

♂ L. about 6 inches, W. 3.28, T. 2.85, t. 0.90, Bf. 0.40.

A young female is thus described in my note-book:—

Olive brown above, upper tail-coverts and tail pale rufous, central feathers brown. Wing umber-brown, the primary coverts faintly tipped dusky; the outer and basal half of the secondaries white. Throat and upper breast dusky brown; whitish on the middle of the abdomen; under tail-coverts very pale rufous.

W. 2.85 inches, T. (frayed) 2.3, t. 0.9, Bf. 0.45.

541. *CISTICOLA TYTLERI*, Blyth.

Sengmai, Munipur valley.

Compared with the type from Dacca in the Indian Museum, Calcutta.

This is a very distinct species, with very pale ochre head and breast, and tail black both above and below.

552b. *NIORNIS ALBIVENTRIS*, n. sp.

Above—dark rich umber-brown, paler on the shoulder of the wing; tail and wing of same colour. Chin sullied white, each feather slightly tipped dusky; the throat greyish white; upper breast crossed by a band of pale rufous; lower breast and abdomen white; flanks rufescent brown; under tail-coverts rusty; pale rusty inside the wing. A palish circle round the eye. Bill horny brown above, pale beneath. Irides?

L. about 4.75 inches, W. 2.1, T. 2.2, t. 0.87, Bf. 0.45, hind toe and claw 0.58, mid toe and claw 0.80.

HAB.—Sengmai, Munipur valley. Obtained by Mr. W. Robert.

It is very close to *Niornis assimilis*, Hodgson, but is larger and more strongly built, and of darker plumage throughout, for whereas the latter is of a greenish hue generally, the above form is rufescent. The tarsi and feet are particularly strong and the mid-toe very long. The bill is identical as regards the nostrils, but is rather deeper and stronger.

610. *PTERYTHRIUS RUFIVENTER*, Blyth.

619a. *MINLA RUFIGULARIS*, Mandelli, S. F., p. 416, July 1873.

*M. collaris*, Walden, August 1874.

Included in 'List of Daffa Birds.'

Until our bird is compared with Mr. Mandelli's from Darjeeling we do not know for certain that they are identical.



619*b*. *MINLA MANDELLII*, Godwin-Austen.

Was described in the Ann. and Mag. Nat. Hist. January 1876, and included in the 'List of Birds of the Daffa Hills', with full description. It is a very common bird in the Nágá hill-ranges. I noticed a bird in the collection at the Jardin des Plantes from Western China very closely allied to these two species, named by A. David *Ixulus superciliaris*: the head above brown; back greyish olivaceous; tail dull rufous brown; a black supercilium from behind the eye to the nape; lores pale; throat and breast dull white; flanks greyish.

686*a*. *ACRIDOTHERES ALBOCINCTA*, Wald. and Aust. Plate V.

Is thus described in 'The Ibis' for 1875, p. 251:—

"Top of head glossy black, feathers rather elongated, and a white collar on back of neck; back dull grey-black, with a slight green tinge, and with a tendency to purple on the shoulders and wing-coverts. Tail black with green reflections. Primaries black, white at base, forming a wing-band; secondaries warm sepia-brown. Beneath dull but dark greenish grey. Upper tail-coverts black, tipped white, and arranged in bars. All the tail-feathers tipped with white, except the two centre ones. Bill and legs yellow.

"Length about 9 inches, wing 5, tail 3·5, tarsus 1·4, bill at front 0·91."

Appears numerous in the Manipur valley, where it was obtained by Mr. Wm. Robert, another important discovery by that indefatigable collector.

727. *MYCEROBUS MELANOXANTHUS*, Hodgson.

From Konchungbum, Manipur, obtained by Mr. Wm. Robert.

|   |                |         |          |           |
|---|----------------|---------|----------|-----------|
| ♂ | W. 4·9 inches, | T. 3·2, | t. 0·82, | Bf. 0·85. |
| ♀ | 4·6 "          | 2·8,    | 0·80,    | 0·83.     |

736. *PROPYRRHULA SUBHEMACHALA*, Hodgson.

Reinta, Manipur.

750. *CHRY SOMITRIS SPINOIDES*, Vigors.

From Khajinghon, Manipur.

867. *SCOLOPAX RUSTICOLA*, Lin.

The woodcock was now and then flushed in the woods of the Nágá Hills, but was not common.



*Additional notes on the Birds of previous Lists.*

## MICRONISUS BADIUS, Gmelin.

There are in the collection two specimens, one an adult and one in immature plumage, from the Eastern Nágá Hills. Jerdon remarks that there is a dusky reddish nape, only conspicuous when the head is bent forwards: in my specimen this is far more pronounced and forms a dull rusty band quite half an inch wide. In the young bird this rusty band is also to be seen coming in on the sides of the neck but not quite meeting in the middle, agreeing with a description of an adult by Mr. A. O. Hume in his 'Scrap Book,' p. 121.

## 205. HIEROCOCCYX VARIUS.

Of 'Fourth List' should be *H. sparverioides*, Vigors.

## SIPHIA SUPERCILIARIS, ♀.

I refer a specimen from the Nágá Hills to the female of the above, and give a description of it, as none is to be found in Jerdon, among whose collection of drawings is a figure of the same sex with dimensions.

Above—head and back dullish olivaceous green; wing umber-brown with rather strong rufous edgings; tail the same colour, with only the faintest rufous tinge. Chin dull pale ferruginous; breast darker, with a sordid green tinge on the flanks; under tail-coverts white, as also the extreme base of both webs of the outer tail-feathers, which in this respect assimilate with those of the male, where we find a greater extent of white.

|                                   | L.   | W.   | T.    | t.    | Bf.   |
|-----------------------------------|------|------|-------|-------|-------|
| Nágá Bird: about 4 inches,        |      | 2.2, | 1.65, | 0.67, | 0.37. |
| Dr. Jerdon's }<br>measurements. } | 4½ " | 2½   | 1½,   | ½,    | ½.    |

## MUSCICAPULA ESTIGMA, Hodgson. ♀

I am indebted to Mr. A. W. Chennell of the Topographical Survey for this specimen. I had previously obtained several males at Shillong Peak and in the forest near Mairang, but had never secured a female. Dr. Jerdon had apparently seen the male only, for no description of the female is given by him.

Above ashy, with an olivaceous tinge, rather rusty near base of bill; wings and tail plain umber-brown. Beneath sordid white.

W. 2.22 inches, T. 1.6, t. 0.61, Bf. 0.35.



*VOLVOCIVORA MELASCHISTOS*, Hodgson.

As the description of immature forms is of great interest, and as none is given in the 'Birds of India,' I append one of a young male of this species obtained at Shillong.

Above—pale ochraceous mottled with black on the head, barred with the same on lower part of back, each feather having a subterminal black band, grey at base; primaries and secondaries, especially the latter, are all tipped cream colour, as well as the primary and lesser coverts, forming two distinct bands; tail-feathers all tipped white, the outermost broadly so. Beneath—greyish white tinged with pale rusty and barred pale grey.

This young bird was shot about the middle of June.

*PARADOXORNIS AUSTENI*, Gould.

Extends into the mountain region of Western China. Examples were obtained by Père Armand David, and are in the collection at the Jardin des Plantes.

*LAYARDIA RUBIGINOSUS*, G-Austen.

In the dimensions given of this bird, in 'Fourth List' (J. A. S. B. Pt. II. 1874 p. 164), the tarsus should be 1.16 not 1.6 inches.

532. *PRINIA FLAVIVENTRIS*.

Lord Walden, in his Supplemental Notes to Blyth's Catalogue of the Birds of Burmah (J. A. S. B., 1875, p. 118), alludes to the presence of a well-marked white supercilium in examples of this species from Manipur; it is not, however, a constant character even there. Among the specimens last obtained near Tezpur, Assam valley, some have the whole side of the head dark grey even to the lores, and noticing the variation I made a drawing of it at the time from a fresh bird. We thus have an interesting gradation from this state of plumage into one with pale lores and yet another where this is developed into a well marked supercilium.

*IXULUS STRIATUS*, Blyth.

Of "First List," p. 109, is *Ixulus castaniceps*, Moore.

*IXULUS CASTANICEPS*.

Of 'Fourth List,' p. 169, is a new species. Dr. Jerdon, who had never seen true *Ixulus castaniceps* described by Moore, when looking over my first collection at Cherra Poonjee, gave it the above title. I have since described it under the name of *Minla Mandellii* in Ann. Mag. Nat. Hist. Jan. 1876, and the description has been repeated in full in the 'List of Birds from the Daffa Hills'. It may after all be Mr. Hume's *Proparus dubius*.



## SPHENOCERCUS SPHENURUS, Vigors.

In the collection under review, specimens of this bird have red feet and legs, as described in Jerdon; curiously enough, however, Khasi Hill birds, obtained near Shillong in May, have them yellow, and hence it was that when recording the specimens in my field-note-book, I entered them under the genus *Orocopus*: in no other point can I detect the slightest difference.

## 795. TURTUR SURATENSIS, Gmelin, white var.

This very pretty albinoid variety is rather smaller in size than ordinary specimens. It is white throughout, the black of the nuchal patch with the white spots being replaced by pale ash-grey, as well as the darker portions of the wing and base of the tail-feathers. This interesting variety was shot at Lakhipur in Kachar.

## 82. ARBORICOLA TORQUEOLA, var.

In my last list I recorded a female of *A. rufogularis* from the Nágá Hills, no male having been seen. Among Mr. Robert's birds there are several fine wood-partridges with red heads, and from the same locality another female similar to the one I got under Japvo Peak in 1872—73. This I now refer to *A. torqueola*, instead of to *A. rufogulare*, the place of which in the list must be taken by the former name. Compared with *A. torqueola* from the Simla Hills, N. W. Himalaya, there are several small but well-marked variations, entitling the Nágá bird to be considered a variety. The legs of the above-mentioned female are, I find, recorded in my field-book as pale fleshy violet, and if Jerdon is right in giving *red* as the colour of those of *A. torqueola* (which I find is the colour noted of a specimen of *A. intermedia* from the Nágá Hills obtained at the same time and place), the Nágá bird would be worthy of a new title. Do the legs of the males and females differ?

## 347. HYDROBATA ASIATICA, Swainson.

This bird is pretty numerous in the streams that flow from the peak of Shillong. Jerdon does not mention the remarkable white circle round the eyes. The adult plumage is as follows:—

Above—dark dull umber-brown; beneath and sides of head sooty black. A lunular white patch both above and below the eye, the lower being the larger; this is its most characteristic point, and it is very conspicuous in the living bird, but in a badly skinned specimen is not to be made out. Irides dark brown. Legs dark brown; the scutæ in front of tarsus pale leadgrey. Bill black.

Length about 8 inches, W. 3·8, T. 2·4, t. 1·3, Bf. 0·87.

During the months of May and June, great numbers of different species of *Drymoecinae* are to be found breeding on the high grass-lands of



the Khasi Hills, and I came upon a large number of their prettily constructed nests, and secured the eggs of *S. fuliginosa*, *Oisticola schænicola*, *Prinia Hodgsoni*, &c., the old birds of which I shot at the time. These nests were generally about two feet above the ground, and constructed of fine grasses, the leaves and stems of which were all drawn in together and the leaves often threaded through with the finer fibres.

XVI.—*Contributions towards a Knowledge of the Burmese Flora.*  
By S. Kurz.

(Continued from Vol. XLIV, p. 190).

*SABIACEÆ.*

*Conspectus of Genera.*

1. *SABIA*. Stamens 4—5, all perfect. Ovary 2—3-lobed. Drupes usually compressed.
2. *MELIOSMA*. Stamens 5, very unequal. Ovary 2—3-celled. Drupes more or less globose.

*Sabia*, Coleb.

*Conspectus of Species.*

- \* *Glabrous*. . . . . *Flowers panicled*.

Flowers about a line across, the pedicels short and thick; leaves coriaceous, *S. limoniacea*. Flowers nearly 4 lin. in diameter, the pedicels capillary and long; leaves membranous, . . . . . *S. viridissima*.

- \* \* *Branchlets and leaf-nerves beneath tomentose; panicles glabrous*, *S. tomentosa*.

1. *S. LIMONIACEA*, Wall. Cat. 1000; Hf. Ind. Fl. II. 3.—(*S. sp.* Griff. Not. Dicot. 423. t. 568. f. 2).

HAB. Chittagong.

2. *S. VIRIDISSIMA*, Kurz in Journ. As. Soc. Beng. 1872, 304; Hf. Ind. Fl. II. 3.

HAB. Not unfrequent in the tropical forests of South Andaman, especially along the western coast.—Fl. May.

*Meliosma*, Bl.

1. *M. SIMPLICIFOLIA*, Bl. in Rumph. III. 197; Miq. Fl. Ind. Bat. I/2 613; Hf. Ind. Fl. II. 5 (*Millingtonia simplicifolia*, Roxb. Corom. Pl. III. t. 254 and Fl. Ind. I. 103; Griff. Not. Dicot. 162. t. 442; *Sabia ? floribunda*, Miq. Suppl. Fl. Sum. 521).

HAB. Tropical forests of Tenasserim, from Moulmein southwards; Ava hills; also Chittagong.—Fl. March, Apr.





Dr. Hooker is in error with regard to the geographical distribution of this species. It occurs not only in Malaya, but also in Hindustan (No. 544 of Wight's Distr. being in my opinion the typical plant).

## ANACARDIACEÆ.

### Conspectus of Genera.

*Trib. I. ANACARDIÆ.* Ovary 1- very rarely 2-celled.

\* *Leaves ternately or pinnately compound (in a very few species not Burmese also simple).*

× Calyx in no way enlarging after flowering.

+ Ovule suspended from near the summit of the cell.

1. ODINA. Petals 4—5, imbricate in bud. Stamens 8—10. Styles 3—4 in the male flowers, the ovary 4—5-parted.

+ + Ovule suspended from a free erect basilar funicle.

2. RHUS. Petals 4—6, imbricate in bud. Stamens 4—10. Styles 3. Leaves compound, very rarely simple. Trees or shrubs.

3. TAPIA. Petals 5, imbricate in bud. Stamens 10. Styles in female flowers singly and short, in the males 4—5. Climbers.

× × Calyx-lobes much enlarging and becoming leafy and wing-like.

4. PARISHIA. Flowers 4-, rarely 3-merous. Stamens 4, rarely 3. Style 3-cleft at the summit.

\* \* *Leaves simple.*

× Petals variously enlarged under the fruit.

5. SWINTONIA. Sepals 5. Stamens 5. Drupe sessile and subtended by the wing-like spreading petals.

6. MELANORRHŒA. Calyx spathaceous, 5-parted. Stamens numerous. Drupe stalked and subtended by the wing-like spreading petals.

× × Petals not enlarging after flowering.

+ Calyx-tube much enlarging and becoming fleshy, either bearing the superior nut or more or less enclosing the same and forming an inferior drupe.

+ Nut more or less enclosed in the fleshy calyx. Ovary inferior.

7. DRIMYCARPUS. Petals imbricate in bud. Stamens 5. Style 1, with a capitate stigma.

8. HOLIGARNA. Petals valvate in bud. Stamens 5. Styles 3. Disk annular or obsolete. Petiole furnished with 2—4 tubercles or barb-like excrescences.

+ + Nut seated on the much enlarged fleshy calyx-base. Ovary superior.

9. SEMECARPUS. Petals imbricate or valvate in the bud. Stamens 5. Styles 3. Disk rather broadly annular. Petiole without excrescences.

10. ANACARDIUM. Petals imbricate in bud. Stamens 8 to 10, all or few of them anther-bearing. Style filiform. Torus stalk-like.

+ + Calyx unchanged in fruit. (Ovules pendulous from a basal funicle).

11. BUCHANANIA. Calyx 3- to 5-toothed. Stamens 10. Carpels 5 or 6, of which one only fertile. Styles as many, short.





12. *GLUTA*. Calyx spathaceous. Stamens inserted on the stalk-like torus. Style filiform.

13. *BOUEA*. Calyx 3- to 5-parted, valvate in bud. Stamens 3—8, all anther-bearing. Style short. Leaves opposite.

14. *MANGIFERA*. Calyx 4—5-parted. Petals 4—5, the nerve usually thickened. Anther-bearing stamens 1—5. Style filiform. Leaves alternate.

*Trib. II. SPONDIEÆ*. Ovary 2—5-celled. Ovules pendulous. Leaves pinnate.

15. *SPONDIAS*. Flowers polygamous. Stamens 8 or 10. Styles 4 or 5, free at the summit.

16. *DRACONTOMELUM*. Flowers hermaphrodite. Stamens 10. Styles 5, thick, connate at their summits and resembling ovaries.

### *Odina*, Roxb.

1. *O. WODIER*, Roxb. Fl. Ind. II. 293; Royle Ill. Him. Pl. t. 31. f. 2; Wight Icon. t. 60; Bedd. Fl. Sylv. t. 123; Hf. Ind. Fl. II. 29.

HAB. Common all over Burma and adjacent islands, especially in the leaf-shedding forests of all kinds.—Fl. Febr. March; Fr. Sept. Octob.

### *Rhus*, L.

#### *Conspectus of Species.*

\* *Leaves 3-foliolate.*

Glabrous, the leaflets entire, ..... *R. paniculata*.

\* \* *Leaves unpaired-pinnate.*

Tomentose, the leaflets serrate-toothed, in 4—6 pairs; endocarp smooth and bony, ..... *R. Javanica*.

Petiole very slender and glabrous, the leaflets in 8—12 pairs, incised-serrate; endocarp fibrous, ..... *R. Khasiana*.

1. *R. PANICULATA*, Wall. Cat. 993; Hf. Ind. Fl. II. 10.

HAB. Not uncommon in the eng-forests of Prome; also Ava.—Fl. Sept.; Fr. Jan.

2. *R. JAVANICA*, L. sp. pl. 380; Brand. For. Fl. 119. (*R. semialata*, Murr. Comm. Goett. VI. 27. t. 3; Hf. Ind. Fl. II. 10; *R. Bucki-amela*, Roxb. Fl. Ind. II. 99; Wight Icon. t. 561).

HAB. Not unfrequent in the drier hill-forests and the hill-eng-forests of Martaban, east of Tounghoo, up to 3000 ft. elevation; also Ava.—Fl. Sept., Oct.; Fr. Apr.

3. *R. KHASIANA*, Hf. Ind. Fl. II. 10.

HAB. Chittagong (*teste* Hook. f.).

### *Tapiria*, Juss.

1. *T. HIRSUTA*, Kurz in Journ. As. Soc. Beng. 1870, 75; Hf. Ind. Fl. II. 28. (*R. hirsuta*, Roxb. Fl. Ind. II. 455; Kurz in Journ. As. Soc. Beng. 1870, 75).

HAB. Chittagong, Ava, Khakyen hills (J. Anderson).





Dr. Hooker claims authority for the name, citing the *Genera Plantarum*, where nothing of the kind occurs.

**Parishia, Hf.**

1. *P. INSIGNIS*, Hf. in Linn. Trans. XXIII. 169. t. 26 and Ind. Fl. II. 30.

HAB. Frequent in the tropical forests of the Andamans; also in Southern Tenasserim.—Fr. May.

**Swintonia, Griff.**

*Conspectus of Species.*

× *Leaves opaque and glaucous beneath.*

Pedicels  $\frac{1}{2}$ —1 lin. long; petals hardly a line long; drupes oblong, ..... *S. Schwenckii*.

× × *Leaves one-coloured and glossy.*

Leaves greyish green, the nerves and net-venation conspicuous; pedicels 3—5 lin. long; petals 2 lin. long, ..... *S. Griffithii*.

Similar to the above, but leaves dark-brown, the net-venation obsolete; drupes obovoid, ..... *S. Helferii*.

1. *S. SCHWENCKII*, Teysm. and Binnend. Cat. Hort. Bog. 230 (line 13 from below); Hf. Ind. Fl. II. 26 (*Astropetalum* sp. 2 Griff. Not. Dicot. 412 teste Hf.).

HAB. Common in the tropical forests of the eastern slopes of the Pegu Yomah and from Martaban down to Tenasserim; also Chittagong.—Fl. Feb.—Apr.; Fr. May.

2. *S. GRIFFITHII*, Kurz in Journ. As. Soc. Beng. 1870, 75; Hf. Ind. Fl. II. 26. (*Astropetalum* sp. 1. Griff. Not. Dicot. 411 t. 565. f. 2. b—d, teste Hf.).

HAB. Tenasserim, Mergui (Griff. 1124).

3. *S. HELFERII*, Hf. Ind. Fl. II. 26.

HAB. Tenasserim (Helf. 1122).

**Melanorrhoea, Wall.**

*Conspectus of Species.*

Leaves glabrous; panicles usually minutely puberulous; fruit-stalk nearly  $1\frac{1}{2}$  in. long, slender, ..... *M. glabra*.

Leaves beneath and panicles pubescent or villous; fruit-stalk short and thick, .. *M. usitata*.

1. *M. GLABRA*, Wall. Pl. As. rar. III. 50. t. 283; Hf. Ind. Fl. II. 25.

HAB. Tenasserim, in forests from Tavoy southwards.—Fl. Decb.

2. *M. USITATA*, Wall. Pl. As. rar. I. 9. t. 11-12 and in Journ. As. Soc. Beng. VIII. 70. c. tab.; Sering. in Bull. Bot. II. 38. t. 4; Hf. Ind. Fl. II. 25. (*M.* sp. Griff. Not. Dicot. 409?).



HAB. Common in the open, especially the eng- and hill-eng-forests, but rare in the dry forests, from Prome and Martaban down to Tenasserim, up to 2000 ft. elevation; also Ava.—Fl. March; Fr. Apr., May.

*Drimycarpus*, Hf.

1. *D. RACEMOSUS*, Bth. and Hf. Gen. pl. I. 424; Hf. Ind. Fl. II. 36. (*Holigarna racemosa*, Roxb. Fl. Ind. II. 82).

HAB. Not unfrequent in the tropical forests of the eastern slopes of the Pegu Yomah; also Chittagong.—Fl. Febr., March; Fr. Jun., July.

N. B.—The genus hardly differs from *Nothopegia* except in the free ovary and in the attachment of the ovules, and stands much in the same relationship to it as *Holigarna albicans* does to *Semecarpus*.

*Holigarna*, Ham.

*Conspectus of Species.*

Leaves glabrous or rarely pubescent beneath; nut entirely enclosed in the obliquely ellipsoid or elliptical perfectly glabrous calyx of an inch length, .... *H. longifolia*.

Leaves usually pubescent beneath and glabrescent, rarely glabrous; male flowers nearly twice as large as those of the preceding; drupe obovoid, tomentose while young, the apex of the nut exposed and forming a convex disk, .... *H. Grahamii*.

2. *H. GRAHAMII*, Kurz in Journ. As. Soc. Beng. 1872, 205; Hf. Ind. Fl. II. 37.

VAR.  $\alpha$ . GENUINA. (*Semecarpus Grahamii*, Wight, Icon. t. 235).

VAR.  $\beta$ . HELFERI. (*H. Helferi*, Hf. Ind. Fl. II. 37; *H. longifolia*, Hf. Ind. Fl. II. 37 and Roxb. Corom. Pl. III. 76 t. 282. the male plant and Fl. Ind. II. 80 quoad plant. masc. e Chittagong).

HAB. Var.  $\beta$ . Frequent in the tropical forests of the Pegu Yomah and the Martaban hills east of Tounghoo.—Fl. March; Fl. Apr., May.

The Hindustani tree has the nut much more exserted and broader. But those of my Burmese plants, though not yet ripe, already shew the obovoid development. *H. Helferi*, Hf. Ind. Fl. l. c. from Mergui (Helf. 1133) is in my eyes only a glabrous form of the above. Dr. Hooker assumes that I have mixed up this species and his *Holigarna albicans*. On reference to a list of Burmese plants sent to me by him, I find that, of the numbers 2014, 2016, and 3328, the first, marked by myself as *Holigarna Grahamii*, as also the remaining two, have been referred at Kew to *H. Grahamii*, but of these No. 2016 is my *Semecarpus albescens*, while No. 3328 (marked at Kew as fruits of *H. Grahamii*) is presently not at hand, and the high number would bring it amongst monocotyledons.

Roxburgh carefully separated his two trees (the Chittagong one and the Hindustani one), describing them separately, and remarked that Hamilton had given the generic name to the Hindustani tree. Wight and Arnott are, therefore, quite correct in identifying with Roxburgh's their tree, which Hooker now rechristens *H. Arnottiana*. I possess flowering





and fruiting specimens of Roxburgh's trees in the H. B. C., collected before the destructive cyclone of 1864, which shew that the Chittagong tree of Roxburgh is *H. Helferi*, and that the Hindustani one is the same as Wight's Herb. No. 569 and consequently *H. Arnottiana*, Hf. The fruits are described and figured as much too ovate. If the ripe fruits and the stigmas of the Burmese species should turn out to be different, Hooker's name (*S. Helferi*) would have to be restored.

### *Semecarpus*, L. f.

#### *Conspectus of Species.*

A. Nut adnate to the hypocarp, barely exserted. Ovary superior.

Leaves glabrous or pubescent and whitish beneath; nut velvety, the hypocarp sappy, veined, and puberulous, ..... *S. albescens*.

B. Nut seated on the hypocarp.

\* Ovary tomentose or pubescent.

× Hypocarp (enlarged base of the calyx) as large or nearly as large as the nut.

Leaves coriaceous, blunt, densely pubescent or tomentose and strongly net-veined beneath; nut not or scarcely oblique, ..... *S. Anacardium*.

Leaves (fullgrown) chartaceous, sharply acuminate, softly pubescent beneath, the net-venation faint; nut very oblique, ..... *S. panduratus*.

× × Hypocarp very small.

Leaves coriaceous, acuminate, quite glabrous or pubescent and very glaucous beneath, the net-venation strong; nut very oblique,  $1\frac{1}{2}$ —1 in. across, ..... *S. heterophyllus*.

\* \* Ovary quite glabrous.

A tree; leaves chartaceous, acuminate, glabrous; panicles quite glabrous; nut an inch broad, ..... *S. subpanduriformis*.

A simple-stemmed shrub with a large subterranean trunk; leaves chartaceous, minutely pubescent beneath and glabrescent; panicles densely puberulous; nut only 3—4 lin. long, ..... *S. subracemosus*.

1. *S. ALBESCENS*, Kurz in Journ. As. Soc. Beng. 1871, 51; Hf. Ind. Fl. II. 35. (*H. albicans*, Hf. Ind. Fl. II. 38 excl. syn; *Semecarpus heterophyllus*, Hf. Ind. Fl. II. 35, non Bl.).

HAB. Not unfrequent in the tropical forests of the Pegu, and the Martaban hills, east of Tounghoo, down to Tenasserim (Helf. 1131).—Fl. Jan. Febr.; Fr. March, Apr.

2. *S. ANACARDIUM*, L. f. Mant. 182; Roxb. Fl. Ind. II. 83 and Corom. Pl. I. t. 12; Wight Icon. t. 558?; Bedd. Fl. Sylv. t. 166; Hf. Ind. Fl. II. 31. (*S. cuneifolia*, Roxb. Fl. Ind. II. 86).

HAB. Chittagong; said to grow also in Burmah, possibly in Ava.—Fl. HS.; Fr. CS.

3. *S. PANDURATUS*, (*S. cuneifolius*, Kurz in Pegu Rep. A. 42, non Roxb.).

HAB. Frequent in the upper mixed forests of the Pegu Yomah and Martaban, up to 2000 ft. elevation; also Chittagong.—Fr. CS.



I formerly identified this species with Roxburgh's *S. cuneifolia*, but Hooker reduces this to *S. Anacardium*, and, I think, correctly so, as it is a Hindustani tree.

4. *S. HETEROPHYLLUS*, Bl. Mus. Bot. I. 187; Miq. Fl. Ind. Bat. I/2. 625.

HAB. Rare in the beach-forests of the Andamans (common on the Nicobars).—Fr. Febr. March.

I (like Hooker) identified flowering male specimens of *Holigarna albicans* with this, but *S. heterophyllus* has flowers more than twice the size and very stout panicles.

5. *S. SUBPANDURIFORMIS*, Wall. Cat. 987; Fl. Ind. Fl. II. 35. (*S. acuminatus*, Wall. ap. Voigt. Cat. Suburb. Calc. 171; Kurz in Journ. As. Soc. Beng. 1870, 75, non Thwait.).

HAB. Frequent in the upper mixed forests of the lower sandstone hills of Arracan; also Chittagong.—Fr. Octob.

6. *S. SUBRACEMOSUS*, Kurz in Journ. As. Soc. Beng. 1872, 304; Hf. Ind. Fl. II. 35. (*S. microcarpus*, Wall. Cat. 989?; Hf. Ind. Fl. l. c. 31?).

HAB. Prome District (Col. Eyre).

#### *Anacardium*, Roxb.

1. *A. OCCIDENTALE*, L. sp. pl. 548; Roxb. Fl. Ind. II. 312; Griff. Not. Dicot. 408, t. 565, fig. e. f.; Bedd. Fl. Sylv. t. 163; Hf. Ind. Fl. II. 20.

HAB. In the beach-forests of Chittagong, Tenasserim, and the Andamans; often cultivated in villages.—Fl. Decb.

#### *Gluta*, L.

##### *Conspectus of Species.*

Leaves coriaceous, the petiole not above 6 lin. long, stout and marginate; panicles and calyx puberulous, ..... *G. Tavoyana*.

Leaves chartaceous, the petiole long and slender, not or only at the apex marginate; panicles and flowers perfectly glabrous, ..... *G. elegans*.

1. *G. TAVOYANA*, Hf. Ind. Fl. II. 22 (*Syndesmis Tavoyana*, Wall. Cat. 1004; *G. Renghas*, Kurz in Pegu Rep. A. 41.)

HAB. Tenasserim, from Tavoy southwards.

I fear nothing but a variety of Linné's *G. Renghas*.

2. *G. ELEGANS*, Kurz in Pegu Rep. A. 41; Hf. Ind. Fl. II. 22 (*Syndesmis elegans*, Wall. in Roxb. Fl. Ind. II. 315). var. *HELPERI*, Hf. l. c.

HAB. Tenasserim. (Helf. 1118. 1117.)

As pointed out by Hooker, more probably a distinct species, but the material at hand is unsatisfactory.

*G. longipetiolata*, Kurz in Pegu Rep. l. c. is a tree, common on the shores of the Andamans, with large green long-petioled leaves unlike those of any other species. Flowers and fruits unknown.



# Buchananiana, Roxb.

## Conspectus of Species.

\* *Leaves and panicles tomentose or pubescent.*

O Leaves tomentose or pubescent on both sides, large.

Panicles stout and stiff; flowers 2 lin. across, sessile and crowded,.....*B. latifolia*.

Panicles slender, grey pubescent; flowers barely a line in diameter, pedicelled and lax,  
.....*B. laxiflora*.

O O Leaves small, puberulous beneath, glossy above, retuse, the petiole  
1—2 lin. long.,.....*B. Siamensis*.

\* \* *Leaves glabrous and more or less glossy, usually fuscous in drying; panicles glabrous or puberulous.*

× Panicles rusty puberulous.

Petiole  $\frac{1}{2}$  in. long; flowers a line across; flowers very shortly pedicelled, crowded,  
.....*B. glabra*.

× × Panicles etc. quite glabrous; flowers pedicelled.

Leaves equally decurrent at the base; pedicels very slender; petals a line long, reflexed; panicles longer than the leaves,.....*B. arborescens*.

Leaves equally decurrent at the base; pedicels short and stout; petals 2—3 lin. long, erect; panicles as long or longer than the leaves,.....*B. acuminata*.

Leaves very unequally decurrent at the base, large; pedicels very slender; petals a line long, reflexed; panicles crowded, shorter than the leaves,.....*B. lancifolia*.

1. *B. LATIFOLIA*, Roxb. Fl. Ind. II. 385; Bedd. Fl. Sylv. t. 165; Hf. Ind. Fl. II. 23.

HAB. Common in the open and dry forests, especially the eng-forests, all over Burma, from Ava and Martaban down to Tenasserim.—Fl. March; Fr Apr.

2. *B. LAXIFLORA*, Kurz in Journ. As. Soc. Beng. 1872, 304; Hf. Ind. Fl. II. 24.

HAB. Martaban hills, along limestone rocks along the Beeling river (Dr. Brandis); Pegu, above Rangoon (Cleghorn).—Fl. Jan. Febr.

Habit of the preceding species.

3. *B. GLABRA*, Wall. Cat. 984; Hf. Ind. Fl. II. 23.

HAB. Upper-Tenasserim, Moulmein (Wall.), *teste* Hf.

4. *B. ARBORESCENS*, Bl. Mus. Bot. I. 183; Miq. Fl. Ind. Bat. I/2. 636 (*Coniogeton arborescens*, Bl. Bydr. 1156; *B. petiolaris*, Miq. l. c. 637; *B. lucida*, Bl. Mus. Bot. I. 184; Hf. Ind. Fl. II. 23; Miq. in Ann. Mus. Lugd. Bat. IV. 117; *B. subobovata*, Griff. Not. IV. 413; *B. Bancana*, Miq. Suppl. Fl. Sum. 205 and 523).

HAB. Tenasserim (*teste* Hf.).

5. *B. ACUMINATA*, Turcz. in Bull. Mosc. 1858. 472.; Hf. Ind. Fl. II. 24 excl. syn. Bl. (*Sorindeia acuminata*, Wall. in Voigt. Cat. Hort. Calc. 150).

HAB. In the moister forests of the Andaman islands (a large-leaved form); Upper Tenasserim, Moulmein (Lobb.) *teste* Hf.

6. *B. LANCIFOLIA*, Roxb. Fl. Ind. II. 386; Hf. Ind. Fl. II. 24.





HAB. Chittagong ; Arracan (Dr. Schlich) ; Tenasserim (Helf. 1115, a bad specimen).—Fl. CS.

7. *B. SIAMENSIS*, Miq. in Ann. Mus. Lugd. Bat. IV. 118.

HAB. Adjoining Siamese province of Radbooree (Teysmann).—Fr. Apr. May.

### *Bouea*, Meisn.

#### *Conspectus of Species.*

Panicles small, sessile or nearly so, quite glabrous ; petals  $\frac{1}{2}$  lin. long ; drupes orange or orange-yellow, ..... *B. oppositifolia*.

Panicles large, long-peduncled, puberulous ; petals a line long or longer ; drupes bluish black, ..... *B. Burmanica*.

1. *B. OPPOSITIFOLIA*, Meisn. MS. ap. Walp. Rep. I. 556 ; Miq. Fl. Ind. Bat. I/2. 635 (*Mangifera oppositifolia*, Roxb. Fl. Ind. I. 640).

HAB. Not uncommon in the tropical forests of Martaban down to Tenasserim and the Andamans ; also much cultivated in villages.—Fl. Jan. Febr. ; Fr. Apr. May.

2. *B. BURMANICA*, Griff. in Journ. As. Soc. Beng. 1854. 634 (*B. Brandisiana*, Kurz in Journ. As. Soc. Beng. 1871. 50 and 1873. 66.)

HAB. Upper Tenasserim, Thounggyeen (Dr. Brandis).—Fl. March.

### *Mangifera*, L.

#### *Conspectus of Species.*

\* *Petals and stamens free, the former inserted at the base of the cushion-like or cupular disk.*

× Panicles and calyx more or less puberulous or pubescent, rarely almost glabrous. Fertile stamen 1.

Panicles and the 3—6 lin. long pedicels very slender, glabrescent or almost glabrous ; petals linear-subulate ; the lateral nerves very thin, ..... *M. longipes*.

Panicles stout ; pedicels short and thick ; petals yellow, streaked red, hardly 2 lin. long ; disk fleshy, 5-lobed ; drupes obtuse, 3—4 in. long ; net-venation lax and thin, ..... *M. Indica*.

Panicles stout ; petals hardly 2 lin. long ; disk 5-lobed ; drupes 1—2 in. long, blunt ; net-venation minute and strongly prominent on both sides, ..... *M. caloneura*.

× × Panicles and calyx perfectly glabrous.

Panicles stout ; pedicels 3—4 lin. long, thick ; petals white, about 3 lin. long ; disk cup-shaped ; drupes acuminate, ..... *M. sylvatica*.

\* \* *Petals and stamens connate with the base of the stalk-like torus, rarely the latter wanting altogether.*

Leaves very coriaceous and shining, almost polished beneath ; flesh of drupe soapy, .. *M. fetida*.

1. *M. LONGIPES*, Griff. Not. Dicot. 419 ; Hf. Ind. Fl. II. 15.

HAB. Frequent in the swamp forests and around jungle-swamps of the Irrawaddi alluvium ; also Tenasserim.—Fl. CS.

2. *M. INDICA*, L. sp. pl. 290 ; Roxb. Fl. Ind. I. 641 ; Bot. Mag. t. 4510 ; Hf. Ind. Fl. II. 13.





HAB. Not unfrequent in the tropical and lower mixed forests, from Arracan and Pegu down to Tenasserim and the Andamans; generally cultivated in several varieties in all villages.—Fl. Febr., March; Fr. May to July.

3. *M. CALONEURA*, Kurz in Journ. As. Soc. Beng. 1873, 66; Hf. Ind. Fl. II. 14.

HAB. Frequent in the low and lower mixed forests of the eastern and southern slopes of the Pegu Yomah.—Fl. Decb. Jan.; Fr. May.

4. *M. SILVATICA*, Roxb. Fl. Ind. I. 644; Hf. Ind. Fl. II. 15.

HAB. Rare in the tropical forests of the Martaban hills.

Most of the wild mangoes I collected in Burmah having been taken from saplings only, I cannot say whether they belong to this or to the preceding species. The species is frequent in the Sikkim Himalaya and the Khasi hills.

5. *M. PÆTIDA*, Lour. Fl. Coch. 199; Roxb. Fl. Ind. ed. Wall. II. 440; Griff. Not. Dicot. 419; Hf. Ind. Fl. II. 18.

HAB. Cultivated in South Tenasserim (*teste* Rev. Mason).

N. B. No. 2020 and 2021 referred at Kew (not by me) to *Mangifera* (Ind. Fl. II. 20) are both referable to *Swintonia Schwenckii*.

#### Spondias, L.

1. *S. MANGIFERA*, Willd. sp. pl. II. 751; Roxb. Fl. Ind. II. 451; Wight Ill. t. 76; Bedd. Fl. Sylv. t. 169; Hf. Ind. Fl. II. 42. (*S. pinnata*, Kurz in Pegu Rep. A. 44).

HAB. Frequent in the mixed forests, especially the upper ones, all over Burmah, from Chittagong, Prome, and Martaban down to Tenasserim, up to 3000 ft. elevation; also Ava.—Fl. March, Apr.; Fr. CS.

There are two varieties of this, the one with large leaflets and drupes as big as a duck's egg, the other with these parts only half the size, but differing in no other respects.

#### Doubtful Species.

*S. ? macrophylla*, Wall. Cat. 8480; Hf. Ind. Fl. II. 43.

HAB. Ava, Taong-tong (*teste* Hf.)

#### Dracontomelum, Bl.

1. *D. MANGIFERUM*, Bl. Mus. Bot. I. 231. t. 42; Hf. Ind. Fl. II. 43.—(*D. sylvestre*, Bl. Mus. Bot. I. 231; Kurz in Pegu Rep. A. 44; *D. puberulum*, Miq. Suppl. Fl. Sum. 524).

HAB. Frequent in the tropical forests of the Andamans.—Fr. Apr. May.





## CONNARACEÆ.

*Conspectus of Genera.*

*Trib. I. CONNARÆÆ.* Calyx imbricate. Seeds without albumen.

ROUREA. Sepals enlarged in fruit, imbricately-cupular. Follicle sessile. Seeds arillate.

ROUREOPSIS. Sepals enlarging, more or less spreading in fruit; follicle sessile.

CONNARUS. Sepals not enlarging or deciduous. Follicle stalked. Seeds arillate.

*Trib. II. CNESTIDÆÆ.* Calyx valvate, 5-parted. Seeds with or without albumen.

× Seeds with albumen.

CNESTIS. Carpels 5—7, sessile, pilose or hispid within. Leaves unpaired pinnate.

× × Seeds without albumen.

TÆNIOCHLÆNA. Sepals reflexed in fruit. Carpels 5, sessile, glabrous within. Leaves unpaired pinnate.

ELLIPANTHUS. Sepals erect. Carpels solitary, tomentose or velvety within. Leaves 1-foliolate.

## Rourea, Aubl.

*Conspectus of Species.*

\* *All parts quite glabrous. Leaflets in few (not above 6) pairs, acuminate.*

Leaflets  $1\frac{1}{2}$ —2 in. long, the rachis and petiolules very slender, ..... *R. pulchella*.

Leaflets 5—3 in. long, the rachis and petiolules stout, ..... *R. commutata*.

\* \* *Inflorescence, leaf-rachis, and often the leaflets beneath puberulous or shortly pilose. Leaflets in numerous pairs, small, usually retuse or rounded.*

× Sepals erect and cupular-closing.

Leaflets pubescent or pilose beneath, ..... *R. villosa*.

Leaflets glabrous on both sides, ..... *R. Wallichiana*.

× × Sepals spreading.

Leaflets obliquely ovate or obovate, 2-lobed at the summit, ..... *R. stenopetala*.

1. *R. PULCHELLA*, Planch. in Linn. XXIII. 419; Miq. Fl. Ind. Bot. I/2. 658; Hf. Ind. Fl. II. 48.

HAB. Tenasserim, Mergui (Griff.).

2. *R. COMMUTATA*, Planch. in Linn. XXIII. 420; Hf. Ind. Fl. II. 47 (*Cnestis monadelphæ*, Roxb. Fl. Ind. II. 454).

Var.  $\beta$ . *PLURIJUGA*, leaves not rarely abruptly pinnate, leaflets in 4—6 rarely in 3 pairs.

HAB. Not unfrequent in the tropical forests of Martaban and Tenasserim down to the Andamans; also Chittagong; var.  $\beta$ . Andamans.—Fl. May, June.

3. *R. VILLOSA*, Planch. in Linn. XXIII. 422; Hf. Ind. Fl. II. 48.

HAB. Apparently frequent in Tenasserim, from Moulmein southwards.—Fr. March.

4. *R. WALLICHIANA*, Planch. in Linn. XXIII. 421; Hf. Ind. Fl. II. 49.

HAB. Tenasserim (*teste* Hf.).





Unknown to me. Hooker points out no structural differences from the preceding, of which it seems to be a glabrescent form only.

5. *R. STENOPETALA*, Hf. Ind. Fl. II. 49. (*Onestis steriopetala*, Griff. Not. Dicot. 433. t. 611 f. 2).

HAB. Tenasserim, Mergui (Griff.) *teste* Hf.

Unknown to me; the narrow petals and spreading sepals point to *Rourcopsis*.

### Connarus, L.

#### Conspectus of Species.

\* *Follicles perfectly glabrous and smooth on the walls inside.*

Rachis of leaves and midrib beneath pubescent, or almost glabrous, the nervation thin, much net-veined especially while young, conspicuously bullate-dotted on the areoles; follicles sessile,  $\frac{1}{2}$  in. long, ..... *C. stictophyllus*.

\* \* *Follicles more or less pubescent or velvety within.*

× Petioles and leaflets beneath, or the nerves only, pubescent.

Leaflets pubescent on the midrib beneath, nerves very slender, in 5 pairs, follicles tomentose, ..... *C. semidecandrus*.

Leaflets finely rusty pubescent beneath, the nerves very indistinct, ..... *C. Griffithii*.

× × Leaflets perfectly glabrous. Follicles stalked.

+ Follicles chartaceous or thin coriaceous, deeply striate.

A large tree; follicles about an in. long or somewhat longer, ..... *C. paniculatus*.

Climber; follicles about an in. long or somewhat longer, ..... *C. gibbosus*.

Apparently as preceding, but the follicles nearly cylindrical, ..... *C. latifolius*.

+ + Follicles woody.

Leaflets thick coriaceous, large; follicles about 2 in. long, ..... *C. grandis*.

1. *C. STICTOPHYLLUS*, Kurz MS.

HAB. Tenasserim; also adjoining Siamese province of Radbooree (Teysmann).—Fl. HS.

2. *C. SEMIDECANDRUS*, Jack in Mal. Misc. 2. VII. 39; Hf. Ind. Fl. II. 52.

HAB. Tenasserim, Mergui (Griff.) *teste* Hf. —Fl. HS.

3. *C. GRIFFITHII*, Hf. Ind. Fl. II. 52.

HAB. Tenasserim, Mergui (Griff.) *teste* Hf.

4. *C. PANICULATUS*, Roxb. Fl. Ind. III. 139; Hf. Ind. Fl. II. 52?

HAB. Chittagong (Roxb.).

Hooker calls this a climber, while Roxburgh states that it is a large timber-tree.

5. *C. GIBBOSUS*, Wall. Cat. 8541; Hf. Ind. Fl. II. 52.

HAB. Common along the outskirts of tropical forests, deserted toung-yas, along river-banks, etc., all over Burma, from Chittagong, Pegu, and Martaban to Tenasserim, up to 2000 feet elevation.—Fl. Apr. May; Fr. May, June.

6. *C. LATIFOLIUS*, Wall. Cat. 8537; Hf. Ind. Fl. II. 53.

HAB. Tenasserim, Moulmein and Tavoy (*teste* Hf.).





Unknown to me, and apparently not sharply distinguished from the preceding.

7. *C. GRANDIS*, Jack in Mal. Misc. II. 7. 40; Planch. in Linn. XXIII. 429; Hf. Ind. Fl. II. 53.

HAB. Tenasserim or Andamans (Helf.) *teste* Hf.

### *Cnestis*, Juss.

#### *Conspectus of Species.*

A scandent shrub; sepals a line long; leaflets usually opposite, ..... *C. platantha*.  
Erect small tree or shrub; sepals 2 lin. long; flowers long-pedicelled; leaflets often  
alternate, ..... *C. ramiflora*.

1. *C. PLATANTHA*, Griff. Not. Dicot. 434 (*C. foliosa*, Planch. MS. *C. flaminea*, Griff. l. c. 433. t. 608. f. 2).

HAB. Frequent in all forests, especially the tropical and moister upper-mixed ones, all over the Pegu Yomah, and from Martaban down to Tenasserim, up to 3000 feet elevation.—Fl. RS.; Fr. HS.

2. *C. RAMIFLORA*, Griff. Not. IV. 432 (*Rourea dasyphylla*, Miq. Suppl. Fl. Sum. 528; *C. ignea*, Planch. MS.).

HAB. Rather frequent in the tropical forests of the Andamans.

### *Ellipanthus*, Hf.

#### *Conspectus of Species.*

\* *Leaves glabrous or nearly so. Follicles glabrous within.*

Leaves and petiole glabrous, the former 4—6 in. long, nerves beneath very slender,  
.. *E. calophyllus*.

Petiole and midrib beneath puberulous; leaves 2—3 in. long, nerves strong beneath,  
.. *E. Helferi*.

\* \* *Leaves pubescent or tomentose beneath. Follicles glabrous within.*

Nerves beneath very slender; follicles 1½—2 in. long, ..... *E. tomentosus*.

1. *E. CALOPHYLLUS*, Kurz in Journ. As. Soc. Beng. 1872, 305; Hf. Ind. Fl. II. 55.

HAB. Frequent in the tropical forests of the Andamans.—Fl. May; Fr. June, July.

2. *E. HELFERI*, Hf. Ind. Fl. II. 55.

HAB. Tenasserim or Andamans (Helf.).

3. *E. TOMENTOSUS*, Kurz in Journ. As. Soc. Beng. 1870, 305; Hf. Ind. Fl. II. 56.

HAB. In the tropical forests of the southern slopes of the Pegu Yomah above Rangoon; Tenasserim.—Fl. Jan.; Fr. March, Apr.

### *LEGUMINOSÆ.*

#### *Conspectus of Genera.*

*Subord. I. Eu-Leguminosæ.* Flowers more or less irregular, rarely almost regular and in this case the standard-petal slightly larger and





innermost in bud. Petals imbricate in bud. Stamens definite, variously connate or rarely free.

*Trib. 1. PAPILIONACEÆ.* Uppermost petal (standard) outside in bud.

\* *Stamens free from the base or slightly connate at the very base only.*

*Subtr. 1. SOPHOREÆ.* Leaves pinnately 1—many-foliolate. Pods indehiscent or dehiscent.

\* *Leaves simple.*

DALHOUSIEA. Bracts, and bractlets large, opposite, persistent. Calyx-teeth very short. Pods compressed.

\* \* *Leaves pinnate. Bracts and bractlets small, deciduous.*

SOPHORA. Pods moniliform, terete or winged, usually indehiscent. Arillus none. Leaves without stipulets.

ORMOSIA. Pods more or less woody, turgid, dehiscent. Arillus none, but the seeds usually bright red-coloured, with a black hilum. Leaves without stipulets.

ARILLARIA. Pods fleshy-coriaceous, short, dehiscent; arillus crimson, enveloping the whole seeds. Leaves with stipulets.

*Subtr. 2. PODALYRIÆ.* Leaves simple or digitately compound. Otherwise as in preceding. (Chiefly Australian plants).

\* \* *Stamens variously united into a tube, or into a slit sheath or into two separate sheaths with the vexillar stamen free or adnate.*

+ Pods jointed, dehiscent or not, very rarely obsoletely or not jointed, in which case the valves are usually marked with transverse veins or lines (in a few genera the pods consist of a single joint).

*Subtr. 3. HEDYSARÆ.* Characters as above. Leaves often pinnately 3—1-foliolate, rarely pinnate.

\* *Stamens united into a single slit sheath, the vexillary 10th one free.*

× Ovules solitary. Pods 1-jointed.

LEPTODESMIA. Pods dehiscent. Flowers in terminal, head-like racemes.

LESPEDEZA. Pods indehiscent. Flowers clustered or in racemes, usually axillary.

× × Ovules 2 or more. Pods 2- or more-, rarely (by abortion) 1-jointed.

O Pods not jointed, compressed or inflated.

† Pod inflated like that of *Crotolaria*.

PYCNOSFORA. Herbs with pinnately 3-foliolate leaves; flowers in racemes.

† † Pod compressed.

OUGEINIA. Pod constricted between the joints. Flowers fascicled from the old wood. Stamens dimorphous, the alternate ones gland-bearing. Trees.

PSEUDARTHRIA. Pods flat with straight sutures. Flowers in terminal racemes. Herbs.

O O Pods distinctly jointed.

† Pod-joints in a line, not folded up.

DESMODIUM. Pod-joints flat or slightly convex, dehiscent or indehiscent. Racemes terminal or axillary and terminal. Leaves 3- rarely 1-foliolate.

ALYSICARPUS. Pod-joints more or less turgid. Calyx deeply divided and almost glumaceous. Leaves often 1-foliolate.





**MECOPUS.** Pod 2-jointed, between uncinnate-subulate bracts, the pedicels abruptly deflexed from the tips. Leaves simple.

† † Pod-joints folded one upon the other.

**LOUREA.** Calyx enlarged in fruit. Flowers in racemes. Leaves 1—3-foliolate.

**URABIA.** Calyx not changed in fruit. Flowers in racemes. Leaves 3—1-foliolate, or pinnate.

\* \* Stamens 10, all united into a single tube or into 2 separate sheaths of 5 each.

× Stamens all united into a single complete tube. Anthers dimorphous.

**ARACHIS.** Calyx-tube filiform, the 4 upper-lobes united, the lowermost thin and free. Petals and stamens inserted at the mouth of the calyx-tube. Pod ripening under the soil. Leaves abruptly pinnate.

**ZORNIA.** Calyx-tube short. Pod 2—6-jointed, muricate. Herbs, the leaves digitately 2—4-foliolate.

× × Stamens united into 2 separate sheaths of 5 each.

+ Pod twisted within the calyx.

**SMITHIA.** Calyx 2-parted. Herbs with abruptly pinnate leaves, the rachis ending in a bristle.

+ + Pod straight.

**GEISSASPIS.** Calyx deeply 2-lipped, the upper lip entire. Herbs with abruptly pinnate leaves. Pods 1—2-jointed, indehiscent.

**ÆSCHYNOMENE.** Calyx 2-lipped. Herbs, rarely undershrubs, with unpaired-pinnate leaves. Pods many-jointed.

**ORMOCARPUM.** Calyx 5-toothed. Pod-joints longitudinally striate or ribbed. Shrubs with unpaired-pinnate leaves.

+ + Pods not jointed, very rarely 1-seeded.

*Subtr. 4. VICIÆ.* Petiole terminating in a bristle or tendril. Leaves abruptly pinnate.

\* Stamens 10, united into a single slit sheath with the tenth vexillary one free.

× Leaflets toothed. Wings free from the staminal tube.

**CICER.** Wings free. Style not bearded at the apex. Pod inflated. Funicle filiform. Erect herbs.

× × Leaflets entire. Wings more or less adhering to the staminal tube.

**VICIA.** Staminal tube oblique at the mouth. Style pubescent, or bearded at the apex. Ovules usually numerous. Erect or twining herbs.

**LENS.** Staminal tube oblique at the mouth. Style filiform. Ovules usually 2. Erect herbs.

**LATHYRUS.** Staminal tube truncate at the mouth. Style flat, or dilated at the apex. Pods more or less compressed. Erect herbs.

**PISUM.** As preceding but style triquetrous and dilated upwards. Pods turgid.

\* \* Stamens only 9, all united into a single slit sheath.

**ABRUS.** Style not bearded. Pods compressed, chambered within. Climbing undershrubs.

*Subtr. 5. PHASEOLEÆ.* Petiole without tendril. Leaves usually pinnately 3-foliolate, very rarely unpaired pinnate.

\* Leaflets not resinous-dotted beneath.

× Stamens united into a slit sheath with the 10th vexillary one free (or rarely shortly adnate.)

+ Nodes of the inflorescence not tumid. Stipules and bracts conspicuous, persistent.





**CLITORIA.** Petals very unequal in length, the standard narrowed at the base, nude at the apex. Calyx-tube cylindrical, longer than the lobes. Erect or climbing herbs or undershrubs.

**SHUTERIA.** Style filiform. Calyx-teeth distinct, the 2 upper ones connate. Anthers conform. Bracts persistent, striate.

**DUMASIA.** Style dilated at the middle. Calyx-tube cylindrical, obliquely truncate at the mouth.

+ + Nodes of the inflorescence tumid.

† Stigma terminal, capitate. Style beardless.

O Anthers all conform.

‡ Twining or creeping herbs. Petals equally long.

**GALACTIA.** Calyx 4-toothed (the 2 upper teeth being united into one). Pod 2-valved.

**GRONA.** Calyx 5-toothed, the 2 upper teeth free. Pod linear, 2-valved. Seeds strophiolate.

‡ ‡ Trees or woody climbers or shrubs.

**BUTEA.** Petals equally long. The 2 upper calyx-teeth free. Pod indehiscent, 1-seeded at the apex, the sterile basal part much dilated and flat.

**ERYTHRINA.** Petals very unequal, the standard exceeding the keel.

O O Anthers dimorphous.

**MUCUNA.** Petals very unequal, the keel exceeding the standard. Woody climbers or twining undershrubs.

† † Style bearded.

O Stigma oblique.

‡ Free part of filaments straight, alternately shorter. Twining herbs.

**PACHYRRHIZUS.** Keel not spirally twisted. Style flat upwards, the stigma almost globose on the inner face. Pod transversely lined between the seeds.

**VIGNA.** Keel not spirally twisted, blunt or arcuate-beaked. Style filiform.

‡ ‡ Free part of filaments once or rarely twice spirally twisted.

**PHASEOLUS.** Keel spiral. Style filiform. The 2 upper calyx-teeth, or all, shorter than the tube. Hilum oblong or shortly orbicular. Twining or rarely almost erect herbs.

O O Stigma terminal. Free part of filaments straight.

**DOLICHOS.** Keel not spirally twisted. Style filiform, minutely penicillate around the minute stigma. Twining or rarely suberect herbs.

**LABLAB.** As preceding, but style thickened upwards, bearded down the inner edge. Twining or suberect herbs.

× × Stamens all united into a complete tube.

+ Nodes of inflorescence tumid.

**CANAVALIA.** Upper-lip of calyx projecting. Style beardless or rarely bearded. Pod indehiscent or late-dehiscing, the upper suture thickened or narrowly 2-winged.

**PSOPHOCARPUS.** Pod 4-cornered, longitudinally 4-winged. Stigma almost globose, densely penicellate-villous.

**DIOCLEA.** Upper teeth of calyx not projecting. Pod oblong, turgid, indehiscent, the upper suture thickened or 2-winged. Anthers dimorphous.





PUERARIA. Upper teeth of calyx not projecting. Pod linear, flattish, readily dehiscing, many-seeded.

+ + Nodes of inflorescence not tumid. Stipules and bracts minute, deciduous.

TERAMNUS. Calyx-teeth free. Alternate anthers abortive.

GLYCINE. Calyx-teeth free, the 2 upper ones more or less connate. Anthers all fertile and conform.

\* \* Leaflets more or less conspicuously resinose-dotted beneath.

+ Ovules 3 or more.

DUNBARIA. Pods plain or slightly turgid, often falcate, not depressed between the obsolete strophioled seeds.

ATYLOSIA. Pod transversely depressed or lined between the seeds. Arillus rather large, grooved.

CAJANUS. Pod transversely depressed between the seeds. Arillus or strophiole none.

+ + Ovules 1 or 2.

x Funicle arising from the centre of the hilum.

CYLISTA. Calyx accrescent and leafy, scarious-membranous, the lowermost lobe largest.

RHYNCHOSIA. Calyx not accrescent in fruit. Pods compressed. Leaves pinnately 3-foliolate.

FLEMINGIA. Calyx not accrescent in fruit. Pod turgid. Leaves digitately 3-foliolate.

x x Funicle arising from the extremity of the linear hilum.

ERIOSEMA. Pod transversely depressed. Erect herbs with axillary flowers. Leaves (in Ind. sp.) simple.

Subtrib. 6. GENISTEÆ. Stamens usually monadelphous, the filaments not dilated upwards; anthers usually alternately longer and basifix or nearly so, the others smaller and versatile. Leaves digitate. Pod often inflated.

\* Anthers dimorphous. Keel-petals firmly cohering.

CROTALARIA. Keel beaked. Pod turgid or inflated. Flowers in terminal or leaf-opposite racemes. Herbs or undershrubs with simple or digitately 3—7-foliolate leaves.

PRIOETROPIS. As preceding, but pods much compressed. Leaves digitately 3-foliolate.

\* \* Anthers uniform. Keel-petal hardly cohering.

ROTHIA. Anthers small. Pods follicle-like dehiscing. Herbs.

Subtrib. 7. LOTEÆ. Stamens usually diadelphous (9 + 1), the filaments dilated upwards. Leaves digitately or pinnately compound.

\* Leaflets quite entire (Lotæ).

LOTUS. Petals adnate to the staminal tube. Keel beaked. Pod 2-valved. Leaves pinnately 5-foliolate.

PAROCHETUS. Petals deciduous, free from the staminal tube, the keel rather acute. Pod 2-valved. Flowers solitary or in poor umbels. Leaves digitately 3-foliolate.

\* \* Veins of leaflets usually produced into marginal toothlets. Leaves pinnately 3-foliolate. Keel-petal blunt.

x Pod spirally falcate or circinate.

MEDICAGO.

x x Pod straight or nearly so.





**TRIGONELLA.** Pod elongate, straight, erect or recurved, indehiscent or dehiscent along one or both sutures.

**MELILOTUS.** Pod small, rotundate or oblong, more or less indehiscent.

*Subtrib. 8. GALEGEE.* Stamens 10, variously connate, the filaments filiform upwards; anthers usually versatile. Pods dehiscent or indehiscent. Leaves unpaired pinnate, rarely simple.

\* *Pods dehiscent (very rarely indehiscent and in this case small and 1-seeded)* (Eu-Galegee).

× Pods distinctly transversely chambered within, dehiscent, or 1-seeded and indehiscent.

† Pods 1-seeded and indehiscent. Hairs basifix.

**PSORALEA.** Anthers blunt. Leaves simple or 3-foliate, the leaflets gland-dotted. Seed adhering to the pericarp.

† † Pods several-seeded and dehiscent.

O Anthers apiculate. Hairs fixed by the centre.

**CYAMOPSIS.** Stamens monadelphously united into a tube. Leaflets entire or toothed.

**INDIGOFERA.** Stamens diadelphous (9 + 1). Leaves pinnately many—1-foliate.

O O Anthers blunt. Hairs basifix.

**SESRANIA.** Style not bearded, the stigma minute. Flowers in axillary racemes. Leaves pinnate. Herbs or undershrubs, rarely trees.

× × Pods not chambered within, many-seeded.

**TEPHROSIA.** Vexillary stamen only at the middle adnate to the staminal tube, free at the base. Pods thin coriaceous. Herbs, undershrubs or rarely shrubs. Leaves pinnately many—1-foliate.

**MILLETTIA.** Filaments diadelphous (9 + 1), filiform. Pod woody or coriaceous. Trees or woody climbers. Leaves pinnate.

\* \* *Pods indehiscent, usually many or several-seeded.* (Dalbergiaceæ).

× Pods wingless.

**PONGAMIA.** Filaments usually long. Pod more or less flattish, firmly fleshy coriaceous. Trees. Leaflets opposite.

**DREPANOCARPUS.** Filaments alternately shorter. Pods reniform or crescent-shaped, coriaceous or drupaceous, 1—3-seeded. Trees or woody climbers. Fl. white or purple. Leaflets alternate.

× × Pods winged along the one or both sutures.

**DALBERGIA.** Filaments alternately shorter. Pods oblong to linear, all round extended into a chartaceous or coriaceous wing. Trees or woody climbers. Flowers from white to rose and purple. Leaflets alternate.

**PTEROCARPUS.** Filaments equally long. Pods almost orbicular or broadly oblong, seed-bearing in the centre and surrounded by a broad complete wing. Trees. Flowers yellow. Leaflets alternate.

**DERRIS.** Filaments alternately shorter. Pod flat, thin or coriaceous, winged along one or both sutures. Trees or woody climbers. Leaflets opposite.

*Trib. 2. CÆSALPINIÆ.* Of the imbricate or valvate petals the uppermost one (standard) innermost in bud. Stamens free or connate.

\* *Anthers erect and basifix, rarely almost versatile, usually opening by 2 apical pores, rarely opening in longitudinal slits.*





*Subtrib. 1. CASSIEÆ.* Leaves unpairedly or abruptly pinnate. Sepals free to the disk, usually imbricate. Ovary or ovary-stalk free.

\* *Petals all developed.*

CASSIA. Sepals imbricate. Stamens 5—10. Leaves abruptly pinnate. Trees, shrubs or herbs.

\* \* *Petals none, or 1—2 and minute.*

DIALIUM. Stamens 2; anthers 2-rimose. Sepals imbricate. Pod turgid or globose. Leaves unpaired pinnate. Trees.

\* \* *Anthers versatile, opening by longitudinal slits.*

*Subtrib. 2. BAUHINIEÆ.* Leaves simple, 2-foliolate or simply pinnate. Calyx gamosepalous, or the sepals free to the disk, imbricate or valvate. Ovary-stalk adnate to the calyx-tube or rarely free.

\* *Leaves simple and more or less 2-lobed, or 2-foliolate. (Eu-Bauhinieæ).*

BAUHINIA. Petals unequal. Calyx gamosepalous or valvate. Pods dehiscent. Leaves palmately 5—many-nerved.

\* \* *Leaves abruptly pinnate. (Amherstieæ).*

× Calyx-tube short, the disk basal or nearly so. (*Cynometreeæ*.)

+ Petals none.

HARDWICKIA. Sepals 5, much imbricate. Stamens 10, all perfect or 1—3 reduced to staminodes. Pod flat-compressed, 2-valved at the apex. Leaflets in 1 to several pairs.

+ + Petals 5 or fewer.

CYNOMETRA. Sepals 4—5. Petals 5, imbricate. Stamens 10 or many. Pod fleshy, indehiscent or tardily dehiscing. Leaflets in 1 to many pairs.

× × Disk at the top of a prolonged calyx-tube. (*Eu-Amherstieæ*).

+ Petal 1—5. Trees.

O Calyx-tube rather short. Petal 1.

SINDORA. Calyx valvate or nearly so, often echinate. Petal sessile. Stamens shortly monadelphous, 2 of them perfect, the rest castrate or reduced to filaments. Leaflets in 2—3 pairs. Seeds arillate. Pods woody, echinate.

O O Calyx-tube elongate.

+ Petal one.

PAHUDIA. Calyx-segments 4, much imbricated. Petal shortly clawed. Stamens 10, 7 of them high-up connate, the rest entirely reduced or 2 of them represented by minute staminodes. Leaflets in 2 or more pairs. Seeds arillate. Pods firmly woody, smooth.

APZELIA. Calyx-segments 4, much imbricated. Petal clawed. Stamens 3—8, free, with or without a few minute staminodes. Pod large, woody or coriaceous. Seeds not arillate. Leaves abruptly pinnate.

+ + Petals 3—5.

TAMARINDUS. Petals 3, with the rudiments of 2 others. Staminodes teeth-like. Stamens monadelphous, only 3 of them developed. Pod turgid, indehiscent, the acid mesocarp pulpy.

AMHERSTIA. Petals 5, 3 of them nearly equally long, and like the lowermost one, very broad, the 2 others minute or rudimentary. Stamens diadelphous (9 + 1).

+ + Petals none.

SARACA. Sepals 4. Stamens 3—9. Pods coriaceous, 2-valved. Trees.





*Subtrib. 3. EUCÆSALPINIÆ.* Leaves usually abruptly bipinnate. Sepals free to the disk, valvate or imbricate. Ovary or ovary-stalk free.

× Sepals valvate or nearly so. Trees.

POINCIANA. Pod 2-valved, flat, coriaceous. Leaves bipinnate, the leaflets all developed. Unarmed.

PARKINSONIA. Pod turgid-moniliform, indehiscent. Petiole very short, spine-like, with 2—4 much elongate pinnæ of minute and often quite reduced leaflets. Armed.

× × Sepals imbricate. Trees or woody climbers.

+ Climbers, usually armed.

CÆSALPINIA. Pods not winged, indehiscent or 2-valved, several-seeded. Stigma small.

PTEROLONIUM. Pods samaroid, indehiscent, the upper end produced into a conspicuous wing-like appendage, 1-seeded. Ovary 1-ovuled.

MEZONEURON. Pod flat, several-seeded, indehiscent, the upper suture extended into a wing. Stigma small.

+ + Erect trees, not armed.

PELTOPHORUM. Pods flat, several-seeded, indehiscent, both sutures extended into a wing. Stigma peltate. Stamens 10, free.

ACROCARPUS. Pods as in preceding, but indehiscent and winged along the upper suture only. Stigma minute. Petals narrow, almost equal. Stamens 5, free.

*Subord. II. Mimoseæ.* Flowers regular, the petals valvate in bud, free or more usually united into a shorter or longer tube. Stamens definite or indefinite, free or connate.

*Trib. 1. MIMOSEÆ.* Stamens definite, usually 10 or 5, or twice as many as the petals.

*Subtrib. 1. MIMOSEÆ VERÆ.* Anthers gland-tipped or not. Stamens free. Calyx valvate in bud.

\* Anthers gland-tipped.

× Flowers in spikes or racemes.

ADENANTHERA. Pods 2-valved, often falcate or circinate, transversely chambered between the seeds. Flowers in spikes or racemes. Erect trees. Leaves bipinnate.

ENTADA. Pods large, the indehiscent joints separating from the persistent thickened sutures. Flowers in spikes. Tendril-bearing woody climbers. Leaves bipinnate

× × Flowers in oblong or globose heads.

NEPTUNIA. Pods flat, 2-valved, thin coriaceous. Flowers in dense heads. Erect herbs. Leaves bipinnate.

\* \* Anthers not gland-tipped.

× Pods more or less jointed, the joints receding from the persistent sutures.

MIMOSA. Flowers in dense spikes or heads. Shrubs or herbs, with bipinnate leaves.

× × Pods continuous, not jointed.

+ Valves of pod chartaceous or thin coriaceous.

DESMANTHUS. Pod flat, narrow, 2-valved. Stigma clavate. Herbs with bipinnate leaves. Flowers in heads.

LEUCENA. Pods flat, rather broad, 2-valved. Stigma capitate. Shrubs or small trees with bipinnate leaves. Flowers in globose heads.





+ + Valves of pod thick and woody, falcate.

**XYLIA.** Pods woody, tardily dehiscing. Flowers in globose heads. Trees with bipinnate leaves.

*Subtrib. 2. PARKIÆ.* Calyx imbricate in bud. Stamens monadelphous.

**PARKIA.** Stamens 10, ~~in~~ neuters reduced to long filaments. Flowers in large long-peduncled heads, the lower ones neuter, the upper ones fertile. Trees with bipinnate leaves.

*Trib. 2. ACACIÆ.* Stamens indefinite, free or connate.

*Subtrib. 3. ACACIÆ VERÆ.* Stamens free.

**ACACIA.** Pods various, dehiscent or not. Flowers in heads or dense spikes. Trees or shrubs, sometimes climbing, with bipinnate leaves or the leaves reduced to phyllodia, armed or unarmed.

*Subtrib. 4. INGÆ.* Stamens connate. Flowers in heads or dense spikes.

\* Seeds without an arillus, but on longer or shorter funicles.

**ALBIZZIA.** Pods straight. Trees with bipinnate leaves.

**PITHECOLOBIUM.** Pods more or less circinnate or cochleate. Trees or shrubs, rarely climbing, with bipinnate leaves.

**CALLIANDRA.** Pods more or less falcate, with much thickened sutures. Trees or shrubs, with bipinnate leaves.

\* \* Seeds conspicuously arillate.

**INGA.** Pods variously circinnate or cochleate. Trees or shrubs with simply pinnate leaves.

#### Arillaria, Kurz.

1. **A. ROBUSTA**, Kurz in Journ. As. Soc. Beng. 1873, 71. (*Sophora robusta*, Roxb. Hort. Bengh. 31.; Wight Icon. t. 245).

**HAB.** Not unfrequent in the tropical forests of the southern slopes of the Pegu Yomah (above and about Rangoon) and in Upper Tenasserim.—Fl. Apr. June.

#### Sophora, L.

1. **S. TOMENTOSA**, L. sp. pl. 533; Roxb. Fl. Ind. II. 316; Miq. Fl. Ind. I. 124; Bth. in Mart. Fl. Bras. Papil. 314, t. 124. (*S. occidentalis*, L. l. c.; Bot. Mag. t. 3390).

**HAB.** Not unfrequent in the beach-forests of the Andamans; also Pegu (Brandis).

#### Lespedeza, Mich.

#### Conspectus of Species.

\* Flowers in axillary almost sessile clusters.

Appressed silvery silk-hairy; leaflets linear-cuneate, ..... *L. sericea*.

\* \* Flowers in axillary and terminal racemes often collected into terminal panicles.

× All parts densely and softly pubescent; bracts deciduous.

Softly tomentose; racemes robust and sessile; calyx-teeth almost filiform and flexuose, ..... *L. pinetorum*.

× × Branchlets and underside of leaves appressedly greyish puberulous.

Racemes glandular-pubescent; bracts persistent, ..... *L. decora*.

Racemes tawny pubescent, not glandular; bracts deciduous, ..... *L. parviflora*.





1. *L. SERICEA*, Miq. Ann. Mus. Lugd. Bat. III. 49; Maxim. Syn. Lesped. 42; Hf. Ind. Fl. II. 142 (*Hedysarum sericeum*, Thbg. Fl. Japon. 289; *L. cuneata*, Don. Gen. Syst. II. 307; *Hedysarum junceum*, Roxb. Fl. Ind. Bat. III. 362, non L. f.).

HAB. Ava, Khakyen hills, east of Bhamo (J. Anderson).—Fl. May.

2. *L. PINETORUM*, Kurz in Journ. As. Soc. Beng. 1873, 230 and l. c. 1874. 184 sub. 13.

HAB. Not unfrequent in the drier hill-forests of Martaban, at 4000 to 6000 ft. elevation.—Fl. Fr. March.

Allied to *L. tomentosa*, Sieb.

3. *L. DECORA*, Kurz in Journ. As. Soc. Beng. 1873, 231; Hf. Ind. Fl. II. 144.

HAB. Frequent in the drier, especially the pine-forests of Martaban, at 4000 to 6000 ft. elevation.—Fl. March; Fr. Apr.

Allied to *L. eriocarpa*, DC.

4. *L. PARVIFLORA*, Kurz in Journ. As. Soc. Beng. 1873, 231; Hf. Ind. Fl. II. 144.

HAB. Martaban hills (Nattoung), east of Tounghoo (Revd. F. Mason).

Allied to *L. elliptica*, Bth., from which it differs by its much smaller flowers, its subulate calyx-teeth, the different vestiture of its inflorescence, and its deciduous bracts.

#### **Pycnospora, R. Br.**

1. *P. HEDYSAROIDES*, RBr. in WA. Prod. I. 197; Bth. Fl. Hongk. 91; Hf. Ind. Fl. II. 153. (*P. nervosa*, WA. Prod. I. 197).

HAB. Tenasserim (Helf. 1813).

#### **Pseudarthria, WA.**

1. *P. VISCIDA*, WA. Prod. I. 209; Wight Icon. t. 286; Hf. Ind. Fl. II. 154. (*Hedysarum viscidum*, L. Syst. III. 506; Roxb. Fl. Ind. III. 356; *Desmodium viscidum*, DC. Prod. II. 316).

HAB. Upper Tenasserim (Falconer, Griff.).

#### **Desmodium, Desv.**

##### *Conspectus of Species.*

**A. DEHISCENTIA.** Pod-joints dehiscing along the ventral suture.

Subg. 1. *Pleurolobium*, DC. Pod-joints dehiscing along the more or less indented suture, distinctly separated or continuous and the separation indicated by a transverse line only. Inflorescence in a young state conspicuously imbricate-bracted.

\* All bracts deciduous. Pods continuous, the joints marked only by transverse lines. Erect shrubs or herbs.

Shrub, the leaflets one-coloured; flowers purple; pod-joints about  $2\frac{1}{2}$  lin. long by 3 broad, densely and shortly hirsute, ..... *D. gyroides*.



Annual or biennial, the leaves as often 1- as 3-foliolate, with the 2 lateral leaflets much reduced, leaflets white-variegated; flowers pale yellow, turning pale brick-coloured; pod-joints about  $2\frac{1}{2}$  lin. long and broad, shortly and sparingly hirsute, .. *D. gyrans*.

\* \* *Lowermost bracts of young inflorescences more or less persistent. Pods distinctly jointed.*

Leaves 3-foliolate, the leaflets elliptical to oblong; fruiting pedicels erect; racemes elongate, ..... *D. heterocarpum*.

Leaves 1—3-foliolate, the leaflets more or less orbicular; fruiting pedicels refracted; racemes shorter than the leaves, ..... *D. retroflexum*.

*Subg. 2. Sagotis*, Walp. Pod-joints dehiscing along the lower more or less indented suture. Young inflorescence not conspicuously bracted.

\* *Flowers in many-flowered terminal and axillary racemes which often form terminal panicles. Erect annual herbs.*

Stems and underside of leaves sparingly and appressedly greyish pubescent; panicle glandular-puberulous; pods glabrescent, ..... *D. oblongum*.

Stems and peduncles spreadingly tawny pilose; pods tawny pilose, ..... *D. auricans*.

\* \* *Flowers few, axillary or in leaf-opposed racemes. Prostrate or diffuse herbs.*

Flowers in leaf-opposed and spuriously terminal simple or branched racemes; leaflets very small, ..... *D. microphyllum*.

Flowers usually yellowish, by 1—4 on a longer or shorter axillary peduncle which is longer than the leaves, ..... *D. reptans*.

Flowers usually purple or rose-coloured, by 1—6 in the leaf-axils, ..... *D. triflorum*.

**B. INDEHISCENTIA.** Pod-joints not dehiscing in any way.

\* *Flowers in terminal and axillary racemes often collected into panicles. Bracts small, deciduous or rarely persistent.*

*Subg. 3. Eu-desmodium*, DC. Shrubs, undershrubs or herbs, the leaves 1—3-foliolate; petiole not winged. Pods various, many-jointed, the joints variously shaped, but never quite square.

\* *Pods and ovary quite glabrous, the joints more or less deeply indented on the lower suture, the basal one very shortly stalked.*

× Leaves simple, broader than long, oblate to reniform.

Flowers 3 lin. long, sky-blue, on capillary glandular pedicels  $\frac{1}{2}$ — $\frac{1}{2}$  in. long; pod-joints deeply indented at the lower suture, ..... *D. oblatum*.

Flowers small, white, on pedicels  $1\frac{1}{2}$ —2 lin. long; pod-joints slightly indented at the lower suture, ..... *D. reniforme*.

× × Leaves oblong to oblong-lanceolate.

Leaves simple, or the lower ones 3-foliolate; racemes slender, in diffuse terminal panicles; pod-joints elliptical, 2 lin. long by  $1\frac{1}{2}$  broad, ..... *D. substipulaceum*.

\* \* *Pods and ovary variously clothed with glandular or glandless, straight or hooked hairs.*

× Pod-joints 4—5 times longer than broad, or if shorter stalk-like narrowed at the base.

+ Pod-joints pedicel-like narrowed or abruptly constricted at the base, securiform or crescent-shaped, puberulous.

O Pod-joints crescent-shaped, abruptly constricted at both ends.

Leaves oblong, acute or blunt, strongly parallel-nerved; pod-joints broadly lunate, tumid and only 2 lin. long, coriaceous, the basal one refracted on a stalk 2 lin. long thickened club-like at the apex, ..... *D. concinnum*.



Leaves divaricately obcordate; pod-joints membranous, broadly lunate, acute and divaricate at both ends, very flat; spreading or trailing herb, .... *D. obcordatum*.

O O Pod-joints securiform, the basal one long-stalked.

Calyx about a line, the corolla 5 lines long; stalk of basal pod-joint about 1— $\frac{1}{2}$  lin. long, ..... *D. scalpe*.

Calyx and corolla half the size; stalk of basal pod-joint slender,  $\frac{1}{2}$  in. long, .. *D. podocarpum*.

+ + Pod-joints truncate at both ends, oblong to linear-oblong and sessile.

O Leaves pinnately 3-foliate.

Pod-joints only 1 $\frac{1}{2}$ —2 lin. long by  $\frac{1}{2}$ — $\frac{1}{4}$  lin. broad, densely hooked puberulous, not narrowed at the ends, ..... *D. recurvatum*.

O O Leaves simple, the petiole short.

Pod-joints 6—8,  $\frac{2}{3}$  in. long, slightly narrowed at both ends, irregularly striate, shortly glandular-pubescent; petioles longer or shorter, ..... *D. armocarpoides*.

Very near the preceding, the petiole very short; pod-joints 10—12, about 3 lin. long and hardly a line broad, shortly glandular-pubescent, ..... *D. teres*.

x x Pod-joints narrow, as long or only twice as long as broad.

+ Shrubs or more usually erect or spreading perennials. Pod-joints usually as long as broad, more or less retundate with truncate ends.

O Leaves simple. Pod-joints indented at the lower suture, about a line long.

Perennial, erect, slightly appressed-pubescent; racemes elongate and very slender; pod-joints sparingly and shortly hispid; leaves acute, ..... *D. Gangeticum*.

As preceding, but diffuse, the leaflets broader and usually blunt, ..... *D. flexuosum*.

Shrub, densely pubescent; racemes tomentose, rather short and robust; pod-joints densely and shortly grey hirsute; leaves blunt, ..... *D. latifolium*.

O O Leaves 3-foliate. Pod-joints about a line long and broad.

Erect shrubby perennial; leaflets somewhat repand, glaucous beneath, acute or acuminate; branchlets almost terete; pod-joints densely covered with hooked stiff hairs, ..... *D. squar.*

Diffuse perennial, the branches sharply 5—6-angular; leaflets entire, blunt; pod-joints sparingly covered with white hooked stiff hairs, ..... *D. difusum*.

+ + Shrubs or woody undershrubs. Pod-joints usually about twice as long as broad, more or less indented on one or both sutures.

O Bracts of the young inflorescence scarious and large, forming imbricate cones, very deciduous, but the basal ones usually remaining persistent.

+ Basal pod-joint sessile.

Racemes sessile or peduncled, rather short; pod-joints 1 $\frac{1}{2}$ —2 lin. long and nearly as broad, indented on the lower suture, appressed hirsute; branchlets sharply angular, often villous on the corners, ..... *D. floribundum*.

+ + Basal pod-joint shortly but distinctly stalked.

Racemes slender, long-peduncled, forming spreading terminal panicles; pod-joints  $\frac{1}{2}$  in. long and 3 lin. broad, puberulous, slightly indented; branchlets terete or nearly so, ..... *D. tiliaefolium*.



Racemes very slender and usually shorter than the leaves, sessile or branched from the base; pod-joints 4 lin. long by  $2\frac{1}{2}$  broad, more or less indented at the lower suture, sparingly and shortly hirsute; branches angular, ..... *D. karenium*.

Racemes sessile or nearly so, robust, usually axillary or paniced by the fall of the leaves; pod-joints 4 lin. long by  $2\frac{1}{2}$  broad, grey-villous, much indented at the lower suture; branchlets rather terete, ..... *D. confertum*.

O O Bracts of the young inflorescence narrow, herbaceous, not conspicuous and imbricating (*Catenaria*, Bth.).

Flowers  $\frac{1}{2}$  in. long, often in axillary slender racemes; pod-joints oblong, nearly 4 lin. long, densely and shortly hooked-hairy, the basal one stalked, .... *D. laburnifolium*.

Subgen. 4. *Pteroloma*, Desv. Shrubs. Leaves 1-foliolate, the petiole winged. Bracts minute. Pods very flat, many-jointed, the joints not or hardly indented and almost square.

Branchlets sharply triquetrous; pods glabrous or pubescent along the sutures or all over, ..... *D. triquetrum*.

\* \* Flowers clustered or in sessile or peduncled umbels in the axils of the leaves or in the axils of bract-like floral leaves.

Subgen. 5. *Dendrolobium*, WA. Flowers in dense sessile or peduncled axillary umbels or clusters. Bracts minute or deciduous. Leaves pinnately 3-foliolate. Pods 5—1-jointed, appressed pubescent.

\* Pods normally 2—1-jointed. Undershrubs. (*Dicerna*).

Flowers by 2—4 or fewer clustered in the leaf-axils and passing into terminal leafy racemes, ..... *D. biarticulatum*.

\* \* Pods 2—5-(only occasionally 1-) jointed. Shrubs or trees (*Dendrolobium* proper).

Flowers in sessile clusters; pod-joints only 2 lin. long, ..... *D. cephalotes*.

Flowers in peduncled umbels; pod-joints about 4 lin. long, ..... *D. umbellatum*.

Subgen. 6. *Phyllodium*, Desv. Flowers clustered or umbellate, in the axils of bract-like large floral leaves which are complicately 2-foliolate, persistent, and placed distichously. Leaves pinnately 3- or rarely 1-foliolate. Pods 2—4-jointed.

\* Pods pubescent or villous-pubescent.

Leaflets 3—5 in. long, acuminate; pods villously pubescent, ..... *D. grande*.

Leaflets 1—2 in. long, rounded or almost retuse, ..... *D. vestitum*.

\* \* Pods glabrous except on the margin.

Leaves pinnately 3- or occasionally 1-foliolate, the petiole only 2—3 lin. long; pods glabrous, net-veined, ..... *D. pulchellum*.

1. *D. GYROIDES*, DC. Prod. II. 326; Hf. Ind. Fl. II. 475 (*D. pseudo-gyroides*, Miq. Fl. Ind. Bat. I. 244).

HAB. Frequent in the mixed forests, especially the upper ones, chiefly in the stony bed of streams, all over Burma, from Arracan, Pegu, and Martaban down to Tenasserim.—Fl. Close of RS.; Fr. CS.

2. *D. GYRANS*, DC. Prod. II. 336; Wight Icon. t. 294; Hf. Ind. Fl. II. 174 (*Hedysarum gyrans*, Lamk. Suppl. 832; Jacq. Icon. rar. t. 562; Roxb. Fl. Ind. III. 317).

HAB. Common in all leaf-shedding forests, but more especially in the savannahs, in grassland and amongst shrubbery of the plains, ascending into the drier hill-forests and hill-pastures up to 4000 ft. elevation, all over Burmah, from Chittagong and Ava down to Tenasserim.—Fl. Fr. CS.



3. *D. HETEROCARPUM*, DC. Prod. II. 337 (*Hedysarum heterocarpum*, L. sp. pl. 1054; Burm. Fl. Zeyl. 117, t. 53; f. 1.; *D. polycarpum*, DC. l. c. 334; Wight Icon. t. 406; Bak. in Fl. trop. Afr. II. 165; Hf. Ind. Fl. II. 171; *Hedysarum purpureum*, Roxb. Fl. Ind. III. 358; *D. patens*, Wight Icon. t. 407; *Hedysarum patens*, Roxb. Fl. Ind. III. 362).

Var. *a.* GENUINUM, branches and leaves beneath only thinly appressed-pubescent; pods glabrous with fringed edges, or sparingly and minutely stiff-hairy.

Var. *β.* TRICHOCaulon, Bak. in Hf. Ind. Fl. II. 172 (*D. trichocaulon*, DC. Prod. II. 336; Hassk. Pl. Jav. rar. 367; Bth. Fl. Austr. II. 235), branches densely and spreadingly pilose, the leaves beneath appressed pilose; the rest as in var. *a.*

Var. *γ.* CAPITATUM, (*D. capitatum*, DC. Prod. II. 225; Miq. Fl. Ind. Bat. I. 241; Hf. Ind. Fl. II. 170; *Hedysarum capitatum*, Burm. Fl. 167, t. 54, f. 1), branches and leaves beneath more or less silvery pubescent, the leaflets smaller; pods puberulous.

HAB. Var. *a.* common in all leaf-shedding forests, especially the mixed ones, entering also the savannahs and cultivated lands, all over Burma and the adjacent islands; var. *β.* Ava hills; var. *γ.* Arracan.—Fl. Close of RS.; Fr. CS.

4. *D. RETROFLEXUM*, DC. Prod. II. 336; Hf. Ind. Fl. II. 170. (*Hedysarum retroflexum*, Linn. Mant. 103).

HAB. Tenasserim (Helf. 1692).

5. *D. OBLONGUM*, Wall. Cat. 5714; Bth. Pl. Jungh. I. 224 in adn.

HAB. Rather frequent in the upper mixed forests of the Pegu Yomah; Ava, Taong Dong (Wall.).—Fl. Nov.; Fr. CS.

This agrees so far with Hasskarl's description of *D. Aparines* (Miq. Fl. Ind. Bat. I. 252), but I have no specimens to compare with.

6. *D. AURICANS*, Grah. in Wall. Cat. 5704; Bth. in Pl. Jungh. I. 223 in adn.; Kurz in Journ. As. Soc. Beng. 1873, 23; Hf. Ind. Fl. II. 172.

HAB. Frequent amongst shrubbery in sandy grounds in the neighbourhood of the sea in Arracan; Tenasserim, Tavoy (Wall.).—Fl. Close of RS.; Fr. CS.

7. *D. MICROPHYLLUM*, DC. Prod. II. 336; Miq. Fl. Ind. Bat. I. 239. (*Hedysarum microphyllum*, Thbg. Fl. Japan. 284; *D. parvifolium*, DC. l. c. 334; Hf. Ind. Fl. II. 174).

HAB. Martaban, Yoonzeleen, at 2500 ft. elevation (Brandis); Ava (teste Baker).—Fl. Fr. March.

8. *D. REPTANS* (*Hedysarum reptans*, Burm. Fl. Zeyl. t. 54, f. 1; Roxb. Fl. Ind. III. 354; *D. heterophyllum*, DC. Prod. II. 334; Hf. Ind. Fl. II. 173; *D. triflorum* var. WA. Prod. I. 229; Wight Icon. t. 291; *Hedysarum heterophyllum*, Willd. sp. pl. III. 1201).





HAB. More in woody lands and amongst shrubbery of Pegu and Tenasserim.—Fl. Fr. RS.

9. *D. TRIFLORUM*, DC. Prod. II. 334; Wight Icon. t. 292; Bth. in Mart. Fl. Bras. XV. 95. t. 26; Hf. Ind. Fl. II. 173. (*Hedysarum triflorum*, L. sp. pl. 1057; Roxb. Fl. Ind. III. 353; *Hedysarum stipulaceum*, Burm. Fl. Ind. t. 54. f. 2.).

HAB. Frequent in short-grassed pastures and in cultivated lands, rubbishy places, along river-banks, &c., all over Burma, from Chittagong and Ava down to Tenasserim; on the Andamans introduced only.—Fl. Fr. RS. chiefly.

10. *D. OBLATUM*, Bak. in Journ. As. Soc. Beng. 1873, 230; Hf. Ind. Fl. II. 166.

HAB. Not unfrequent in the tropical forests, especially along rocky choungs, of the Pegu Yomah and the Martaban hills; also Prome hills; Ava, on Taong-Dong.—Fl. Fr. C. and HS.

11. *D. RENIFORME*, DC. Prod. II. 327; Hf. Ind. Fl. 173. (*Hedysarum reniforme*, L. sp. pl. 1051; Burm. Fl. Ind. t. 52. f. 1.).

HAB. Prome; Ava, on the banks of the Irrawaddi (according to Baker).

All Burmese specimens seen by me belong to the preceding species. I myself gathered the true Burmannian plant only in the Terai-lands of Sikkim.

12. *D. SUBSTIPULACEUM*, Bl. MS. (*D. stipulaceum*, Miq. Fl. Ind. Bat. I. 252, non. DC.; *Hedysarum mucronatum*, Bl. Buitenz. Cat. 92).

HAB. Martaban, Nattoung Hills. (Revd. F. Mason).

This species greatly resembles the American *D. stipulaceum*, DC. (which I suppose to be the same as *D. cajanifolium*, DC., referred to by Baker in Fl. Ind. II. 161). It differs in its stouter stature and its broad ovate (not linear-subulate) calyx-lobes. The pod-joints are glabrous and net-veined, not hooked-pilose like those of Hasskarl's *D. Aparines*, which Miquel combines with *D. stipulaceum*, while Baker would make it synonymous with *D. spirale*.

13. *D. CONCINNUM*, DC. Prod. II. 335; Miq. Fl. Ind. Bat. I. 245; Hf. Ind. Fl. II. 170. (*D. pendulum*, Wall. Pl. As. rar. I. t. 94.).

HAB. Not unfrequent in grass-lands of the drier hill-forests (especially the pine-forests) of Martaban, at 4000 to 6000 ft. elevation.—Fr. March.

14. *D. OBCORDATUM*, Kurz in Journ. As. Soc. Beng. 1873, 229; Hf. Ind. Fl. II. 166. (*Uraria obcordata*, Miq. Suppl. Fl. Sumatr. 114 and 305).

HAB. Tenasserim, Moulmein District (Falconer).—Fr. Febr.

15. *D. SCALPE*, DC. Prod. II. 334; Bak. in Fl. trop. Afr. II. 164; Hf. Ind. Fl. II. 165. (*D. strangulatum*, WA. Prod. I. 228; Wight Icon. t. 985).



HAB. In the moister hill-forests of Martaban, east of Tounghoo, at 4000 to 5000 ft. elevation.

Baker identifies the *D. trichocaulon* of Hasskarl's Pl. Jav. rar. 367 with the above, but this he could only do by simply guessing, for the description does not in the least agree and the dehiscent pods at once indicate its true affinity.

16. *D. PODOCARPUM*, DC. Prod. II. 336 ; Hf. Ind. Fl. II. 165.

HAB. Ava Hills.

N. B. If *D. laxum*, DC. l. c. (*Hedysarum laxum*, Spreng. Syst. app. 292) is correctly referred to the above species (as to which I entertain grave doubts), this name has precedence.

17. *D. RECURVATUM*, Grah. in Wall. Cat. 5717 ; WA. Prod. 226 ; Wight Icon. t. 374 ; Miq. Fl. Ind. Bat. I. 250. (*Hedysarum recurvatum*, Roxb. Hort. Bengh. 57. and Fl. Ind. III. 358 ; Wight Icon. t. 409 ; *Hedysarum diffusum*, Roxb. Fl. Ind. III. 357, non Willd ; *D. laxiflorum*, DC. Prod. II. 335 ; Hf. Ind. Fl. II. 164 ; *D. diffusum* ; DC. l. c. 335, not 336).

HAB. Common in the dry and upper mixed forests of Chittagong, Arracan, and Pegu.—Fl. Close of RS. ; Fr. CS.

18. *D. TERES*, Wall. Cat. 5694 ; Bth. in Pl. Jungh. I. 225 in adn. ; Hf. Ind. Fl. II. 164.

HAB. Ava, Taong Dong (Wall.).

19. *D. GANGETICUM*, DC. Prod. II. 327 ; Wight Icon. t. 271 ; Hf. Ind. Fl. II. 168. (*Hedysarum Gangeticum*, L. sp. pl. 1052 ; Roxb. Fl. Ind. III. 349 ; *Hedysarum collinum*, Roxb. Fl. Ind. III. 348 ; *D. latifolium*, Wight Icon. t. 272).

HAB. Frequent in all deciduous forests, especially the mixed ones, also entering the savannahs and cultivated lands, all over Burma, from Chittagong and Ava down to Tenasserim.—Fl. RS. ; Fr. CS.

20. *D. FLEXUOSUM*, Wall. Cat. 5691 ; Bth. in Pl. Jungh. 224, in adn. ; Hf. Ind. Fl. II. 168.

HAB. Prome Hills.

This, as already suggested by Bentham, is hardly more than a diffuse variety of *D. Gangeticum*, with broader leaves and spreadingly hirsute branches.

21. *D. LATIFOLIUM*, DC. Prodr. II. 328 ; Wight Icon. t. 370 ; Hf. Ind. Fl. II. 168. (*Hedysarum latifolium*, Roxb. Hort. Beng. 57 and Fl. Ind. III. 350 ; Bot. Reg. t. 355 ; *D. lasiocarpum*, DC. Prod. II. 328 ; Bak. in Fl. trop. Afr. II. 162).

HAB. Frequent in the dry and open forests of Ava, Prome, Pegu, and Martaban.—Fl. Close of RS. ; Fr. CS.

22. *D. SEQUAX*, Wall. Pl. As. rar. II. t. 157 ; Hf. Ind. Fl. II. 170.





(*D. sinuatum*, Bl. MS. ap. Miq. Fl. Ind. Bat. I. 255 ; Hf. Ind. Fl. II. 166 ; *D. dasylobum*, Miq. Suppl. Fl. Sum. 113 and 305).

HAB. In the drier hill-forests of Martaban, east of Tounghoo, at 4000 to 5000 ft. elevation.

23. *D. DIFFUSUM*, DC. Prod. II. 336 ; Wight Icon. t. 298 ; Hf. Ind. Fl. II. 169. (*Hedysarum diffusum*, Willd. Sp. pl. III. 1180 ; *Hedysarum auriculatum*, and *H. quinqueangulatum*, Roxb. Fl. Ind. III. 355 ; *D. quinqueangulare*, Wight Icon. t. 293).

HAB. Prome Hills (Wall. Cat. 5716, D.).—Fl. Sept.—Octob.

24. *D. FLORIBUNDUM*, Don. Gen. Syst. II. 297 ; Hf. Ind. Fl. II. 167. (*Hedysarum floribundum*, Don. Prod. Nep. 244 ; *D. multiflorum*, DC. Prod. II. 335 ; *D. dubium*, Ldl. Bot. Reg. t. 967 ; Bot. Mag. t. 2960).

HAB. Not unfrequent in the drier hill-forests of Martaban and Upper Tenasserim, at 4000 to 5000 ft. elevation.—Fl. Close of RS. ; Fr. March.

25. *D. TILLOFOLIUM*, Don. Gen. Syst. II. 297 ; Hf. Ind. Fl. II. 168.

HAB. Tenasserim, Tavoy (according to Baker).

26. *D. KARENSIUM*, Kurz, MS.

HAB. Martaban, rare in the pine-forests east of Tounghoo, at 4000 to 5000 ft. elevation ; Ava, Khakyen Hills east of Bhamo.—Fr. March.

27. *D. LABURNIFOLIUM*, DC. Prod. II. 337 ; Hf. Ind. Fl. II. 163. (*Hedysarum laburnifolium*, Poir. Dict. VI. 422 ; *Catenaria laburnifolia* Bth. in Pl. Jungh. I. 220).

HAB. Ava Hills.

28. *D. TRIQUETRUM*, DC. Prod. II. 326 ; Hf. Ind. Fl. II. 163. (*Hedysarum triquetrum*, L. sp. pl. 1050 ; Roxb. Fl. Ind. III. 847 ; *Pteroloma triquetrum*, Bth. in Pl. Jungh. I. 220).

VAR.  $\alpha$ . *GENUINUM*, pods more or less greyish hirsute or villous, larger and usually somewhat curved ; flowers larger.

VAR.  $\beta$ . *PSEUDO-TRIQUETRUM*, (*D. pseudo-triquetrum* and *D. alatum*, DC. Prod. II. 326 ; *Hedysarum alatum*, Roxb. Fl. Ind. III. 348), pods glabrous or pubescent only on the edges, shorter and straight ; flowers smaller.

HAB. Common in all leaf-shedding forests, especially the mixed ones, but also ascending into the drier hill-forests up to 5000 ft. elevation ; all over Burma, from Chittagong and Ava down to Tenasserim and the Andamans ; var.  $\beta$ . equally common, but restricted to low levels.—Fl. Fr. Close of RS., and CS.

29. *D. BIARTICULATUM*, F. Muell. Fragm. Phyt. II. 121 ; Bth. Fl. Austr. II. 231 ; Hf. Ind. Fl. II. 163. (*Dicerma biarticulatum*, DC. Prod. II. 339 ; Wight Icon. t. 419 ; *Hedysarum biarticulatum*, L. sp. pl. 1054 ; Roxb. Fl. Ind. III. 359).



HAB. Ava, Irrawaddi valley at Mengoon (J. Anderson) and Paghamyo (Wall.).—Fr. Jan.

30. *D. CEPHALOTES*, Wall. Cat. 5721; Wight Icon. t. 373; Bedd. Fl. Sylv. 87. Anal. t. 12. f. 4; Hf. Ind. Fl. II. 162. (*Dendrolobium cephalotes*, Bth. Pl. Jungh. I. 218; *Hedysarum cephalotes*, Roxb. Fl. Ind. III. 360; *Hedysarum umbellatum*, Roxb. l. c.; *D. congeatum*, Wall. Cat. 5723; Wight Icon. t. 209).

HAB. Common in the mixed forests, especially the lower ones, entering also the savannahs; all over Chittagong and Ava, down to Pegu and Arracan.—Fl. Close of RS.; Fr. CS.

31. *D. UMBELLATUM*, DC. Prod. II. 325; Bth. Fl. Austr. II. 230; Hf. Ind. Fl. II. 161. (*Dendrolobium umbellatum*, WA. Prod. I. 224; *Hedysarum umbellatum*, L. sp. pl. 1053).

HAB. Frequent in the beach-forests all along the coasts of the Andamans and Tenasserim; re-appears on the limestone hills of Segain, Ava.—Fl. Fr. CS.

32. *D. GRANDE*, Kurz in Journ. As. Soc. Beng. 1874, 184; Hf. Ind. Fl. II. 162.

HAB. Ava, Irrawaddi valley near Tagoung (J. Anderson).—Fl. RS.

33. *D. VESTITUM*, Bth. MS.; Hf. Ind. Fl. II. 162. (*Phyllodium vestitum*, Bth. in Pl. Jungh. I. 217).

HAB. Tenasserim, from Moulmein down to Mergui.—Fr. CS.

34. *D. PULCHELLUM*, Bth. in Hongk. Fl. 83; Hf. Ind. Fl. II. 162. (*Dicerna pulchellum*, DC. Prod. II. 339; Wight Icon. t. 418; *Hedysarum pulchellum*, Roxb. Fl. Ind. III. 361).

HAB. Frequent in all deciduous but chiefly in the open and dry forests, all over Burma, from Chittagong and Ava down to Tenasserim; also Andamans.—Fl. RS.; Fr. CS.

### *Alysicarpus*, Neck.

#### *Conspectus of Species.*

\* *Calyx shorter than the first pod-joint.*

Pod-joints inflated-globular, without wrinkles or veins, ..... *A. monilifer*.

Pod-joints slightly compressed, thickened at the truncate ends, obsoletely wrinkled-net-veined, ..... *A. vaginalis*.

\* \* *Calyx much longer than the first pod-joint, the teeth much imbricate in fruit.*

Calyx-lobes lanceolate, acuminate; pods as long or twice as long as the calyx, the joints (fully ripe) almost smooth, obliquely 4-angular, ..... *A. bupleurifolius*.

Glabrous; calyx-lobes broader and acute; pod enclosed in the scarious calyx, the joints broader than long, strongly and transversely wrinkled, ..... *A. rugosus*.

As preceding, but stems silk-hairy, the calyx-lobes and bracts fringed with long silky hairs; pod-joints twice the size, ..... *A. styracifolius*.





1. *A. MONILIFER*, DC. Prod. II. 353; Hf. Ind. Fl. II. 157. (*Hedysarum moniliferum*, L. Mant. 102; Burm. Fl. Ind. t. 52, f. 3; Roxb. Fl. Ind. III. 345).

HAB. Ava; Tenasserim, near Moulmein (Wall.).

2. *A. VAGINALIS*, DC. Prod. II. 353; Hf. Ind. Fl. II. 158. (*Hedysarum vaginale*, L. sp. pl. 1051; Roxb. Fl. Ind. III. 345).

Var.  $\alpha$ . *GENUINA*, leaves all, or only the cauline ones, narrow.

Var.  $\beta$ . *NUMMULARIFOLIUS*, Miq. Fl. Ind. Bat. I. 232; Hf. Ind. Fl. II. 158. (*Alysicarpus nummularifolius*, DC. Prod. II. 353; *Hedysarum nummularifolium*, L. sp. pl. 1051), leaves all more or less oval or almost orbicular, usually small and sometimes very small or minute.

HAB. Frequent in grassy places of all leaf-shedding forests and in cultivated lands, all over Chittagong, Pegu, and Martaban, down to Tenasserim; var.  $\beta$ . more in the drier forests, in sandy pastures, etc.—Fl. Close of RS.; Fr. CS.

3. *A. BUPLEURIFOLIUS*, DC. Prod. II. 352; Hf. Ind. Fl. II. 158. (*Hedysarum bupleurifolium*, L. sp. pl. 1081, non Roxb.; *Hedysarum gramineum*, Retz. Obs. v. 26; Roxb. Fl. Ind. III. 646).

HAB. Frequent in long-grassed jungle-pastures of the dry and open (especially the low) forests, from Ava and Prome down to Pegu.—Fl. RS.; Fr. CS.

4. *A. RUGOSUS*, DC. Prod. II. 353; Bth. Fl. Austr. II. 239; Hf. Ind. Fl. II. 159. (*Hedysarum rugosus*, Willd. sp. pl. III. 1173; *Hedysarum bupleurifolium*, Roxb. Fl. Ind. III. 646, non L.; *A. Wallichii*, WA. Prod. I. 234).

HAB. Frequent in all leaf-shedding forests, especially in the savannahs and savannah-forests, and in grassy cultivated lands of the alluvial plains of Pegu.—Fl. Close of RS.; Fr. CS.

5. *A. STYRACIFOLIUS*, DC. Prod. II. 353. (*Hedysarum glumaceum*, Koen. ap. Roxb. Fl. Ind. III. 247; *A. rugosus* var. *styracifolius*, Bak. in Hf. Ind. Fl. II. 159).

HAB. Ava (according to Baker).

N. B. *Hedysarum procumbens*, Roxb. Fl. Ind. III. 346, is the same as *Alys. hamosus*, Edg., and Roxburgh's name has precedence.

#### **Mecopus, Benn.**

1. *M. NIDULANS*, Benn. in Horsf. Pl. Jav. rar. 154, t. 32; Miq. Fl. Ind. Bat. I. 266; Hf. Ind. Fl. II. 160.

HAB. Very common in the upper mixed forests of the Pegu Yomah, less frequent in similar forests of Martaban and Tenasserim.—Fl. Close of RS.; Fr. CS.





### Lourea, Neck.

#### Conspectus of Species.

\* *Glabrous herbs. Calyx glabrous.*

Terminal leaflet several times broader than long, transversely divaricate-lunate,

..... *L. vespertilionis*.

Terminal leaflet barely twice as broad as long, obversely reniform, ..... *L. paniculata*.

\* \* *More or less puberulous or pilose herbs. Calyx pubescent or villous.*

Leaflets obversely reniform to oblate; racemes simple, terminal, ..... *L. reniformis*.

1. *L. PANICULATA*, Wall. Cat. 5673; Bth. in Pl. Jungh. I. 215 in adn.; Hf. Fl. II. 154.

HAB. Ava, Taong dong (Wall.).

2. *L. RENIFORMIS*, DC. Prod. II. 324. (*Hedysarum reniforme*, Lour. Fl. Coch. II. 345; *L. obovata*, Desv. Journ. Bot. III. 122; Hf. Ind. Fl. II. 154).

HAB. Ava, on the limestone hills of Segain and Pagha myo (Wall.).—Fl. Oct.

### Uraria, Desv.

#### Conspectus of Species.

\* *Flowers in elongate slender lax racemes, the upper ones collected into terminal panicles.*

× Bracts subulate, persisting at the flowering. Pedicels in fruit straight, but reflexed.

Calyx-lobes  $1\frac{1}{2}$  lin. long, long-tawny-pilose; stipules lanceolate,  $\frac{1}{2}$  in. long; pods densely hooked-hispid, ..... *U. cordifolia*.

× × Bracts very deciduous long before opening of the flowers. Pods minutely puberulous. Pedicels in fruit arcuate.

Pods glossy; calyx about 2 lin. long, in fruit rather ample and almost enclosing the pod, ..... *U. campanulata*.

Pods opaque; calyx  $1\frac{1}{2}$ —2 lin. long, very much shorter than the pod, ..... *U. hamosa*.

\* \* *Flowers in dense thick simple or almost simple racemes.*

× Bracts all very deciduous and fallen long before opening of the flowers.

O Upper leaves pinnately 5—9-foliolate.

† Leaflets narrow.

Leaflets white-variegated, blunt or bluntish, the net-venation beneath strong and close; pod-joints leaden-coloured, polished; seeds pale-coloured, ..... *U. picta*.

Leaflets glaucous-green, one-coloured, long and very sharply acuminate, the net-venation very thin and lax; pod-joints glossy; seeds brown, ..... *U. acuminata*.

† † Leaflets broad.

Leaflets with prominent and close net-venation; pod-joints opaque, ..... *U. crinita*.

O O Leaves 1- and 3-foliolate (often on the same plant).

Rather stout plant, usually tawny pilose; pods opaque, net-veined, ..... *U. Lagopus*.

× × Bracts all persistent at flowering time and conspicuous.

Robust, the racemes elongate and brown-pilose; pods glossy black, .... *U. alopecuroides*.

Slender, the racemes short and greyish pilose; pods pale-coloured, opaque, *U. lagopoides*.



1. *U. CAMPANULATA*, Wall. Cat. 5685; Voigt Hort. Cale. 221. (*Lourea campanulata*, Bth. in Pl. Jungh. I. 215 in adn.; Hf. Ind. Fl. II. 155).

HAB. Ava, Taong Dong (Wall.).—Fl. R. and CS.; Fr. CS.

This species connects *Uraria* and *Lourea*, two genera rather too artificially separated.

2. *U. HAMOSA*, Wall. Cat. 5681; Wight Icon. t. 284; Hf. Ind. Fl. II. 156. (*Doodia hamosa*, Roxb. Fl. Ind. III. 367; *Desmodium Horsfieldii*, Miq. Fl. Ind. Bat. I. 251; *Desmodium dasyphyllum*, Miq. l. c. 253, teste Baker).

HAB. Frequent in all leaf-shedding forests, especially the mixed ones and the eng-forests, entering also the savannahs, from Chittagong and Ava down to Pegu and Arracan.—Fl. Close of RS.; Fr. CS.

*Doodia simplicifolia*, Roxb. Fl. Ind. III. 366, seems to be only the simple-leaved form of this species, which Wallich distributed under the name of *U. leptostachya*.

3. *U. CORDIFOLIA*, Wall. Pl. As. rar. I. 33, t. 37; Hf. Ind. Fl. II. 157.

HAB. Not unfrequent in the dry forests of Ava and Prome, occasionally seen in the drier upper mixed forests of the Pegu Yomah.—Fl. Fr. Close of RS.

4. *U. FICTA*, Desv. Journ. d. Bot. III. 122; Wight Icon. t. 411; Hf. Ind. Fl. II. 155 (*Hedysarum pictum*, Jacq. Icon. rar. III. t. 567; *Doodia picta*, Roxb. Fl. Ind. III. 368).

HAB. Not rare along river-banks and in grass-lands of Chittagong and Arracan; also Ava.—Fl. Fr. RS.

5. *U. ACUMINATA*, Kurz MS.

HAB. Not unfrequent in the eng-forests of Pegu and Martaban.—Fl. CS.

Very near to the preceding, but it has altogether a different look and differs in the characters given above.

6. *U. CRINITA*, Desv. Journ. d. Bot. III. 122; Hf. Ind. Fl. II. 155 excl. syn. Icon. Wight. (*Hedysarum crinitum*, L. Mant. 102; Burm. Fl. Ind. 169. t. 56; *Doodia crinita*, Roxb. Fl. Ind. III. 369).

Var.  $\beta$ . *MACROSTACHYA*, Wall. Pl. As. rar. II. 8. t. 110; more robust, the leaves larger; racemes 1—1½ feet long.

HAB. Frequent in the mixed forests all over Burma, from Chittagong, Ava, Pegu, and Martaban down to Tenasserim.—Fl. Close of RS.; Fr. CS.

7. *U. LAGOPUS*, DC. Prod. II. 324; Hf. Ind. Fl. II. 156 (excl. syn. Wight and Roxb.) (*U. lagopoides*, Royle Ill. Him. Pl. 201 t. 33. f. 1.).

HAB. Chittagong.—Fl. Close of RS.

8. *U. ALOPECUROIDES*, Wight Icon. t. 290. (*Doodia alopecuroides*,



Roxb. Fl. Ind. III. 368; *U. repanda*, Wall. Cat. 5677; Bth. in Pl. Jungh. I. 269; Hf. Ind. Fl. II. 156).

HAB. Along the banks of the Irrawaddi in Prome and Ava.—Fl. RS.

9. *U. LAGOPOIDES*, DC. Prod. II. 324; Wight Icon. t. 289; Hf. Ind. Fl. II. 156 (*Hedysarum lagopoides*, L. sp. pl. 1057; Burm. Fl. Ind. 68. t. 53. f. 2.; *Doodia lagopodioides*, Roxb. Fl. Ind. III. 366).

HAB. Chittagong; most probably in other parts of Burma.—Fl. RS.

### Zornia, Gmel.

1. *Z. DIPHYLLA*, Pers. Syn. II. 318; Bth. Fl. Austr. II. 228 and in Mart. Fl. Bras. XV. 80. t. 21-22; Hf. Ind. Fl. II. 147 (*Hedysarum diphyllum*, L. sp. pl. 560; Roxb. Fl. Ind. III. 353.)

HAB. Not unfrequent on sandy or gravelly pastures and in grassy places of the eng and dry forests, all over Arracan, Pegu, and Prome; also Ava.—Fl. Fr. RS.

### Arachis, L.

\*1. *A. HYPOGÆA*, L. sp. pl. 1040; Roxb. Fl. Ind. III. 280; WA. Prod. I. 280; Miq. Fl. Ind. I. 281.

HAB. Cultivated all over Burma.—Fl. Fr. R. and CS.

### Smithia, Ait.

#### Conspectus of Species.

- \* *Fruiting calyx simply striate, not reticulate, the lobes more or less acute; joints of pod more or less globular.*

Calyx-lobes quite glabrous and nude; flowers in slenderly peduncled naked heads or short racemes.....*S. sensitiva*.

Calyx-lobes more or less hairy-fringed on the keel beneath; flowers in denso sessile heads involucred by the uppermost leaves,.....*S. conferta*.

Calyx-lobes minutely toothed, the teeth all excurrent into long stiff bristles; flowers in dense slenderly peduncled naked heads,.....*S. ciliata*.

- \* \* *Fruiting calyx urceolate-bell-shaped, striate and net-veined, the lobes more or less truncate; pod-joints (and also the seeds) much compressed.*

Leaflets in 4 to 2 pairs; upper part of stipule about 3 lin. long; pod-joints 10—12, about a line long, papillose,.....*S. dichotoma*.

Leaflets in 10—15 pairs; upper part of stipule nearly an in. long; pod-joints 20—25, 2 lin. long or longer, veined,.....*S. grandis*.

1. *S. SENSITIVA*, Ait. Hort. Kew. III. 496 t. 13; Roxb. Fl. Ind. III. 342; Salisb. Parad. Lond. t. 92; Hf. Ind. Fl. II. 148. (*S. Javanica*, Bth. in Pl. Jungh. I. 211; Miq. Fl. Ind. Bat. I. 271).

HAB. Very frequent in moist pasture-land, along grassy borders and in fallow fields, especially in diluvial lands, all over Burma, from Chittagong, Pegu, and Martaban down to Tenasserim.—Fl. Fr. RS.



2. *S. CONFERTA*, Sm. in Rees Cyclop. XXXIII. No. 2; Miq. Fl. Ind. Bat. I. 272. (*S. geminiflora*, var. *conferta*, Bak. in Hf. Ind. Fl. II. 149; *S. hispidissima*, Zoll. in Geneesk. Arch. III. 55).

HAB. Tenasserim, Tavoy (Wall. Cat. 5668 I).—Fl. Octob.

3. *S. CILIATA*, Royle Ill. Him. Pl. 201. t. 35. f. 2; Hf. Ind. Fl. II. 150.

HAB. Not unfrequent in the hill-pastures and in grassy spots of the drier hill-, especially the pine-forests of Martaban, at 3500 to 5000 feet elevation; also largely entering the deserted hill-toungyas.—Fl. Fr. RS.

4. *S. DICHOTOMA*, Dalz. MS.; Hf. Ind. Fl. II. 150.

HAB. Arracan, in long-grassed pastures on sandstone banks near the sea opposite Akyab.—Fl. Fr. Octob.

5. *S. GRANDIS*, Bth. MS.; Hf. Ind. Fl. II. 151.

HAB. Pegu, in diluvial lands bordering the southern and western base of the Pegu Yomah, rather rare in temporarily inundated long-grassed jungle-pastures.—Fl. Fr. RS.

#### Geissaspis, WA.

1. *G. CRISTATA*, WA. Prod. I. 218; Bedd. Icon. t. 293; Hf. Ind. Fl. II. 141.

HAB. Common in wet pastures, rice-fields, etc., especially of the alluvial plains, all over Arracan, Pegu, and Martaban down to Tenasserim; also Ava.—Fl. RS.; Fr. Close of R. and begin of HS.

#### Æschynomene, L.

##### Conspectus of Species.

Calyx and corolla glabrous, the latter only 4 lin. long; pod-joints only 2 lines long, .. *Æ. Indica*.

Calyx and outside of keel of corolla sparingly hairy, the corolla about an in. long; pod-joints about  $\frac{1}{2}$  in. long, ..... *Æ. aspera*.

1. *Æ. INDICA*, L. sp. pl. 1061; Wight Icon. t. 405; Hf. Ind. Fl. II. 151. (*Æ. Cachemiriana*, Camb. in Jacq. Voy. 40. t. 48; *Æ. sensitiva*, P. d. B. Fl. d'Owar. 89. t. 53, non Sw.; *Hedysarum Neli-tali*, Roxb. Fl. Ind. III. 365; *Smithia aspera*, Roxb. l. c. 343).

HAB. Frequent in swamps and along swampy river-sides, in wet pastures, etc., all over Burma, from Chittagong and Ava down to Tenasserim.—Fl. Fr. RS.

2. *Æ. ASPERA*, L. sp. pl. 1060; Wight Icon. t. 299; Hf. Ind. Fl. II. 152. (*Hedysarum lagenarium*, Roxb. Fl. Ind. III. 365; *Æ. trachyloba*, Miq. Fl. Ind. Bat. I. 276).

HAB. Chittagong and Arracan, along borders of tanks and in swampy grass-lands; probably also in Pegu and elsewhere.—Fl. Fr. RS.



**Ormocarpum, P. d. B.**

1. *O. SENNOIDES*, DC. Prod. II. 315; Wight Icon. t. 297; Hf. Ind. Fl. II. 152. (*Hedysarum sennoides*, Willd. sp. pl. III. 1207; Roxb. Fl. Ind. III. 364; *O. ochroleucum*, Zoll. and Mor. Syst. Verz. 6.; Miq. Fl. Ind. Bat. I. 1083).

HAB. Siam; most probably also in Tenasserim.

**Cicer, L.**

\*1. *C. ARIETINUM*, L. sp. pl. 1040; Roxb. Fl. Ind. III. 324; Bot. Mag. t. 2274; Wight Icon. t. 20; Schrank Handb. t. 202; Sibth. Fl. Graec. t. 703; DC. Legum. t. 54; Hf. Ind. Fl. II. 176.

HAB. Generally cultivated in the plains all over Burma.—Fl. Fr. CS.

**Vicia, L.***Conspectus of Species.*

Flowers solitary, almost sessile, nearly  $\frac{1}{2}$  in. long; pods glabrous, 6—18-seeded,  
.. *V. sativa*.

Flowers hardly 2 in. long, several (2—8) forming a peduncled raceme; pods shortly hairy, 2-seeded, ..... *V. hirsute*.

\*1. *V. SATIVA*, L. sp. pl. 1037; Roxb. Fl. and 323, III. t. 522; Engl. Bot. t. 334; Schrank Fl. Monac. III. t. 264; Sturm Deutschl. Fl. VIII. t. 31; Alef. in Bonpl. 1861, 71; Hf. Ind. Fl. II. 178.

HAB. Ava, Bhamo (J. Anderson).—Fl. Febr.

**Lens, Gren. and Godr.**

\*1. *L. ESCULENTA*, Moench Meth. 131; Alef. in Bonpl. 1861, 130. (*Ervum Lens*, L. sp. pl. 1039; Koch Syn. Fl. Germ. 172; WA. Prod. I. 235; Schrank Handb. t. 102; Sturm Deutschl. Fl. VIII. t. 32; *Cicer Lens*, Willd. sp. pl. III. 1114; Roxb. Fl. Ind. III. 324).

HAB. Chittagong, cultivated by natives.—Fl. Fr. CS.

**Lathyrus, L.***Conspectus of Species.*

Leaves reduced to tendril-like petioles; stipules  $\frac{1}{4}$ —1 in. long, sagittately ovate; flowers yellow, ..... *L. Aphaca*.

Leaves pinnate, with 1—2 pairs of leaflets; stipules half-sagittate, small; flowers skyblue or white, ..... *L. sativus*.

\*1. *L. SATIVUS*, L. sp. pl. 1030; Roxb. Fl. Ind. III. 322; Sibth. Fl. Graec. t. 695; Bot. Mag. t. 115; Koch Syn. Fl. Germ. 174; Hf. Fl. Ind. Fl. II. 179.

HAB. Chittagong, cultivated only.—Fl. Fr. CS.



**Pisum, L.**

\*1. *P. SATIVUM*, L. sp. pl. 1026; Roxb. Fl. Ind. III. 321; Koch Syn. Fl. Germ. 172; Schrank. Fl. Monac. III. t. 261.

Var.  $\alpha$ . *SATIVUM*, flowers larger, white; seeds globular or nearly so, pale coloured or green.

Var.  $\beta$ . *ARVENSE*. (*P. arvense*, L. sp. pl. 1027; Koch. Syn. Fl. Germ. 172; Sturm. Deutschl. Fl. II. t. 4; Sibth. Fl. Græc. t. 687; flowers white or pale violet, the wings and keel purple; seeds somewhat depressed angular, greyish, brown- or purple-mottled.

HAB. Var.  $\alpha$ . Cultivated in Ava, Prome, Pegu, etc.; var.  $\beta$ . cultivated in Chittagong.—Fl. Fr. CS.

**Abrus, L.***Conspectus of Species.*

Pods  $\frac{1}{2}$ — $\frac{1}{3}$  as broad as long, somewhat crumpled; seeds terete, ..... *A. precatorius*.  
Pods flat and straight, 4 to 5 times as long as broad; seeds compressed, .. *A. levigatus*.

1. *A. PRECATORIUS*, L. Syst. 533; Roxb. Fl. Ind. III. 257; Bth. Fl. Hongk. 92; Hf. Ind. Fl. II. 175.

HAB. Frequent in the mixed forests, especially the lower and upper ones, but also in hedges, etc., of cultivated lands, all over Burma, from Chittagong and Ava down to Tenasserim.—Fl. Close of RS.; Fr. CS.

2. *A. LEVIGATUS*, E. Mey. Comm. Pl. Afr. 263; Harv. Fl. Cap. II. 263.—(*A. pulchellus*, Wall. Cat. 5819; Baker in Fl. trop. Afr. II. 175 and Fl. Ind. II. 875; *A. melanospermus*, Hassk. Cat. Bog. 282; Miq. Fl. Ind. Bat. I. 159).

HAB. Pegu, Rangoon (Cleghorn); Upper Tenasserim, between Chappedong and Amherst (Wall.).—Fl. Close of RS.; Fr. CS.

N. B. Thwaites' *A. pulchellus* differs by its much larger and broader seeds.

**Clitoria, L.***Conspectus of Species.*

\* Corolla quite glabrous.

Leaflets in 2 or rarely in a single pair; bractlets roundish, ..... *C. Ternatea*.

\* \* Standard more or less pilose outside; leaves pinnately 3-foliolate.

Calyx glabrous, the teeth much shorter than the tube; bractlets only 2—3 lin. long, linear, subulate-acuminate; flowers by twos, peduncled, ..... *C. Mariana*.

Calyx puberulous, the teeth as long as the tube; bractlets broader and larger, nearly  $\frac{1}{2}$  as long as the calyx; flowers by 3—6 clustered in the leaf-axils, .... *C. Grahamii*.

1. *C. TERNATEA*, L. sp. pl. 1086; Bot. Mag. t. 1542; Roxb. Fl. Ind. III. 321; Hf. Ind. Fl. II. 208.

HAB. Not unfrequent in the mixed forests, more especially the savannah-forests, all over Chittagong and Ava down to Tenasserim; also





in hedges, in shrubbery, along river-sides, etc., of cultivated lands.—Fl. Fr. chiefly RS.

2. *C. GRAHAMII*, Steud. Nomencl. Bot. 2nd ed. ; Bth. in Pl. Jungh. II. 232 in adn.

Var. *α. GRAHAMII* (*C. Grahamii*, Steud. l. c.) elongate, twining, appressed pubescent ; bractlets broader and larger, nearly half as long as the calyx ; leaflets acuminate or sharply acuminate ; calyx-lobes narrower, subulate-acuminate ; pedicels very short, the raceme almost reduced ; standard more pilose outside.

Var. *β. MACROPHYLLA* (*C. macrophylla*, Wall. Cat. 5345 ; Bth. in Linn. Proc. II. 38 ; Hf. Ind. Fl. II. 209), more robust in all parts, the shoots and petioles spreadingly tawny pubescent, glabrescent ; leaves larger, acute or nearly so ; raceme short, often branched ; the rest as in preceding.

HAB. Tenasserim (Helf. 1727), Tavoy (Wall. Cat. 5346) ; Bithoko range, at 3000 ft. elevation (Brandis) ; var. *β. Ava*, Taongdong ; and Prome hills (Wall.)—Fl. Fr. RS.

### Shuteria, WA.

#### Conspectus of Species.

More or less hairy ; racemes sessile, naked ; pods hairy, ..... *Sh. vestita*.  
All parts (also the pods) quite glabrous ; racemes filiform, furnished with 1 or 2 distant whorls of broad floral leaves, ..... *Sh. suffulta*.

1. *S. VESTITA*, WA. Prod. I. 207 ; Wight Icon. t. 165 ; Hf. Ind. Fl. II. 181.

HAB. Common in grassy places and amongst sunny shrubbery of the drier hill-forests of Ava and Martaban, at 3000 to 5000 ft. elevation, in places descending to 2000 ft.—Fr. HS.

2. *S. SUFFULTA*, Bth. in Pl. Jungh. I. 232 in adn. ; Hf. Ind. Fl. II. 182.

HAB. Frequent in the drier upper mixed and the dry forests, ascending into the drier hill-forest up to 4000 ft. elevation, all over Burma, from Ava and Martaban down to Pegu.—Fl. Close of RS. ; Fr. DS.

### Dumasia, DC.

#### Conspectus of Species.

Young parts, ovary, and pods more or less pubescent, ..... *D. villosa*.  
All parts, also the ovary, glabrous, ..... *D. leiocarpa*.

1. *D. LEIOCARPA*, Bth. in Pl. Jungh. I. 231. (*D. villosa* var. *leiocarpa*, Baker in Hf. Ind. Fl. II. 183).

HAB. Not unfrequent in grasslands and amongst shrubbery of the drier hill- (especially the pine-) forests of the Martaban hills, east of Tounghoo, at 4000 to 5000 ft. elevation.—Fr. March.



Differs from the glabrous Ceylon plant chiefly in the smaller leaves, and in the pods, which are not torulose.

### Galactia, P. Br.

#### Conspectus of Species.

All parts scantily and minutely appressed-pubescent; leaves glabrous above,  
.. *G. tenuiflora*.

All parts, also the upper side of the leaves, softly but shortly pubescent, .. *G. villosa*.

1. *G. TENUIFLORA*, WA. Prod. I 206; Miq. Fl. Ind. Bat. I. 220; Hf. Ind. Fl. II. 192. (*Glycine tenuiflora*, Willd. sp. pl. III. 1057; Roxb. Fl. Ind. III. 319).

HAB. Ava, Irrawaddi, on the hills opposite the island Loongyi (Wall. Cat. 5520).—Fl. Sept.

2. *G. VILLOSA*, WA. Prod. I. 207; Miq. Fl. Ind. Bat. I. 220. (*G. tenuiflora* var. 3. *villosa*, Bak. in Hf. Ind. Fl. II. 192).

HAB. Ava, Segain, on the limestone hills.—Fr. Nov.

### Grona, Bth., vix Lour.

#### Conspectus of Species.

Leaves 3-nerved at the base, glabrous above; flowers  $\frac{1}{2}$  in. long, in lax racemes,  
.. *G. Grahamii*.

Leaves palmately 5-nerved, sparingly hirsute on both sides; flowers 2 lin. long, yellow, solitary on filiform axillary peduncles, ..... *G. filicaulis*.

1. *G. GRAHAMII*, Bth. in Pl. Jungh. I. 233; Hf. Ind. Fl. II. 191.

HAB. Prome hills (Wall.).—Fl. Sept., Octob.

2. *G. FILICAULIS*, Kurz in Journ. As. Soc. Beng. 1873, 232; Hf. Ind. Fl. II. 191.

HAB. Frequent in the low and the savannah-forests of the Irrawaddi plains of Pegu.—Fl. Close of RS.; Fr. CS.

### Butea, Roxb.

(*Meizotropis*, Voigt Cat. Hort. Calc. 239; *Megalotropis*, Griff. Not. Dicot. 441.)

#### Conspectus of Species.

Subg. 1. *Butea*, Roxb. Corolla very large, orange-scarlet, appressed silk-hairy outside, the keel and standard more or less acute.

× Pods stalked.

Tree; pedicels  $\frac{1}{2}$ —1 in. long, ..... *B. frondosa*.

Woody climber; pedicels 1—1 $\frac{1}{2}$  in. long, ..... *B. superba*.

× × Pods sessile.

Erect shrub; corolla only an inch long, ..... *B. minor*.

Subg. 2. *Spatholobus*, Hassk. Corolla small, white or purple; glabrous keel and standard more or less blunt. Woody climbers.

Leaves large, beneath appressed silvery pubescent; pods stalked; flowers white,  
.. *B. parviflora*.





Leaves small, glabrous to the naked eye; pods sessile; flowers white, .... *B. acuminata*.

1. *B. FRONDOSA*, Roxb. Corom. Pl. I. t. 21 and Fl. Ind. III. 244; Hook. Bot. Misc. III. 102, and Wight III. Ind. Bot. Suppl. 57. t. 32; Bedd. Fl. Sylv. t. 176; Hf. Ind. Fl. II. 194.

HAB. Frequent in the lower mixed and the dry forests, more especially however in the savannah-forests and entering even the tidal savannahs; all over Burmah, from Ava and Martaban down to Tenasserim.—Fl. March, Apr.; Fr. Apr., May.

2. *B. SUPERBA*, Roxb. Corom. Pl. I. t. 22. and Fl. Ind. III. 247; Hf. Ind. Fl. II. 195.

HAB. Frequent in the mixed forests, especially the upper ones, all over Burmah, from Arracan, Prome, and Martaban down to Upper Tenasserim.—Fl. March, Apr.; Fr. May, June.

3. *B. PARVIFLORA*, Roxb. Fl. Ind. III. 248; WA. Prod. I. 261; Wight Icon. t. 210. (*Spatholobus Roxburghii*, Bth. in Pl. Jungh. I. 238 in adn.; Hf. Ind. Fl. II. 193).

HAB. Frequent in all mixed forests, especially the upper ones, entering also occasionally the tropical and open forests; all over Chittagong, Pegu, and Martaban down to Tenasserim.—Fl. Febr.—Apr.; Fr. DS.

4. *B. ACUMINATA*, Wall. Cat. 5443. (*Spatholobus acuminatus*, Bth. in Pl. Jungh. I. 238 in adn.; Hf. Ind. Fl. II. 194).

HAB. Frequent in the tropical forests all over Pegu and Martaban down to Tenasserim; also Chittagong.—Fl. Fr. HS.

### *Erythrina*, L.

#### *Conspectus of Species.*

\* *Wings of corolla much longer than the spathaceous calyx.*

× Pod bearing the few seeds at or towards the narrowed end only, the lower sterile part greatly dilated as in *Butea*.

Subg. 1. *Hypaphorus*, Hassk. Pods dehiscing at both sutures, the pilated sterile part contracted into a stalk 1—2 in. long. Seeds 1—3, free. Flowers almost sessile.

Standard glabrous; keel-petals wholly connate, obcordate and shortly acuminate in the sinus, ..... *E. lithosperma*.

Standard minutely velvety; keel consisting of 2 obliquely oblong rather acute petals united at the middle only, ..... *E. holosericea*.

× × Pod many-seeded, seed-bearing from the base.

Subg. 2. *Duchassaingia*, Walp. Pods flat, torulose, opening only along the sinuate outer suture, the dorsal suture prominent and straight. Seeds free, but usually separated by spurious spongy septa.

Glabrous, glaucous; standard broad, notched; pods minutely greyish-velvety, .. *E. ovalifolia*.

Subg. 3. *Stenotropis*, Hassk. Pods torulose and almost moniliform, the valves opening at both sutures and exposing the continuous pithy-chartaceous indehiscent endocarp enclosing the seeds.



Glabrous; leaves membranous or chartaceous; pods glabrous, ..... *E. Indica*.  
 \* \* *Wings of corolla minute, as long as or shorter than the  
 spathaceous calyx.*

*Subg. 4. Micropteryx*, Walp. Pods follicle-like opening along the ventral suture, continuous. Seeds free.

Leaves rigidly chartaceous or almost coriaceous, more or less shortly tomentose or puberulous beneath; calyx spathaceously 2-lobed, ..... *E. suberosa*.  
 Leaves chartaceous, glabrous, acuminate; calyx spathaceous, ..... *E. stricta*.

1. *E. LITHOSPERMA*, Miq. Fl. Ind. Bat. I. 209, vix Bl.; Hf. Ind. Fl. II. 190. (*E. Sumatrana*, Miq. Suppl. Fl. Sum. 304).

HAB. Frequent on the small savannahs along hill-streams, river-sides, etc., in the vicinity of tropical forests, all over the Pegu Yomah and the Martaban hills.—Fl. Jan., Febr.; Fr. March, Apr.

The subgenera of *Erythrina* are better marked than many of the other Leguminous genera generally adopted by botanists. But here, like in *Sterculia*, the great uniformity of habit seems to be in favour of their reduction.

2. *E. HOLOSERICEA*, Kurz in Journ. As. Soc. Beng. 1873. 69.

HAB. Pegu, Tharrawaddi District (Dr. Adamson).

A curious species, the flowers of which much resemble those of *E. ovalifolia*, while the leaves (if they really belong to the flowers) are those of *E. lithosperma*.

3. *E. OVALIFOLIA*, Roxb. Fl. Ind. III. 254; Wight Icon. t. 247; Hf. Ind. Fl. II. 189. (*Duchassaingia ovalifolia*, Walp. in Linn. XXIII. 742).

HAB. Frequent in the tidal forests and the tidal savannahs of Lower Pegu; often also cultivated in villages.—Fl. Febr., March.

4. *E. INDICA*, Lamk. Encycl. Meth. II. 391; Roxb. Fl. Ind. III. 249; Wight Icon. t. 58; Hf. Ind. Fl. II. 188. (*E. bisetosa*, Griff. Not. Dicot. 441).

HAB. Frequent in the beach-forests all along the coasts of Burmah and the adjacent islands; recurs in the dry Prome District but there very rare; often planted in villages.—Fl. March, Fr. June, Sept.

5. *E. SUBEROSA*, Roxb. Fl. Ind. III. 253; Hf. Ind. Fl. II. 189. (*Micropteryx suberosa*, Walp. in Linn. XXIII. 744).

HAB. Not unfrequent in the upper mixed forests of the Pegu Yomah.—Fl. March, Apr.

6. *E. STRICTA*, Roxb. Fl. Ind. III. 251; WA. Prod. I. 260; Bedd. Fl. Sylv. t. 175; Hf. Ind. Fl. II. 189. (*Micropteryx stricta*, Walp. in Linnaea XXIII. 740).

HAB. Frequent in the upper mixed forests of the Pegu Yomah and the Martaban hills, east of Tounghoo.—Fl. March, Apr.; Fr. May, June.



**Mucuna, Adans.***Conspectus of Species.*

\* *Pods winged along the sutures, or lamellate, or both.*

*Subg. 1. Citta, Lour.* Pods transversely and obliquely lamellate on the valves, but not winged on the sutures. Seeds orbicular.

Racemes corymb-like, short-peduncled; pods 1-seeded, ..... *M. monosperma*.

*Subg. 2. Carpopogon, Roxb.* Sutures of pod dilated into broad wings, the valves smooth on the faces. Seeds orbicular.

Flowers yellowish or white; pod 3—4 in. long, appressed tawny setose, .. *M. gigantea*.

\* \* *Pods without sutural wings, the valves either quite plain, or longitudinally ribbed only on the faces.*

*Subg. 3. Stizolobium, Pers.* Characters as above. Pods often longitudinally ribbed on the sutures.

× Pods stalked, glabrescent, torose. Seeds orbicular.

Arboreous climber; flowers variegated dark-purple; pod 1—3 ft. long, plain, .. *M. macrocarpa*.

× × Pods sessile, plain or longitudinally ribbed. Seeds transversely oblong.

+ Pods densely setose, not glabrescent. Flowers purple.

Peduncle naked; flowers arising from a knob; pods with two longitudinal ribs along the upper suture; leaves pubescent beneath, ..... *M. pruriens*.

Peduncle bracted; flowers from a secondary peduncle about 2 lin. long; pod without ribs; leaves almost glabrous, ..... *M. bracteata*.

+ + Pods velvety, glabrescent. Flowers white.

Pods longitudinally ribbed,  $\frac{1}{2}$  ft. long, ..... *M. nivea*.

1. *M. MONOSPERMA*, DC. Prod. II. 406; Wight in Hook. Bot. Misc. II. 346. suppl. t. 12, and Icon. t. 35; Hf. Ind. Fl. II. 185. (*Carpopogon monospermum*, Roxb. Fl. Ind. III. 283; *M. anguina*, Wall. Pl. As. rar. III. t. 236).

HAB. Frequent in the mixed forests, especially the lower ones, all over Pegu, Chittagong, and Arracan; also Tenasserim, Tavoy.—Fl. Close of RS.; Fr. DS.

2. *M. GIGANTEA*, DC. Prod. II. 405; Wight in Hook. Bot. Misc. II. 257; Suppl. t. 14; Hf. Ind. Fl. II. 186. (*Dolicho's giganteus*, Willd. sp. pl. III. 287; *Carpopogon giganteum*, Roxb. Fl. Ind. III. 287).

HAB. Frequent along the sea-coast, especially in the beach-jungles, of the Andaman islands; also Tenasserim.—Fl. Fr. DS.

3. *M. MACROCARPA*, Wall. Pl. As. rar. I. 41. t. 47; Hf. Ind. Fl. II. 186.

HAB. Not unfrequent in the hill-forests, especially the drier ones, and in the pine forests of Martaban east of Tounghoo, at 4000 to 6000 ft. elevation; also Ava hills.—Fl. March; Fr. HS.

4. *M. PRURIENS*, DC. Prod. II. 405; Hf. Ind. Fl. II. 187. (*M. prurita*, Hook. Bot. Misc. II. 257. Suppl. t. 13; Bot. Mag. t. 4945;



*Carpopogon pruriens*, Roxb. Fl. Ind. III. 283; *Dolichos pruriens*, L. sp. pl. 1020, quoad plant. Asiat.; *M. utilis*, Wall.; Wight Icon. t. 280).

HAB. Frequent in all leaf-shedding forests, especially the lower ones, in hedges, shrubbery, etc., around villages, and along river-sides of the plains, all over Pegu and Prome; also Ava.—Fl. Close of RS.; Fr. C. and HS.

5. *M. BRACTEATA*, DC. Prod. II. 406; Kurz in Journ. As. Soc. Beng. 1873, 231; Hf. Ind. Fl. II. 186. (*Carpopogon bracteatum*, Roxb. Hort. Beng. 54).

HAB. Frequent in shrubbery along choungs in the tropical forests of Pegu and Martaban, ascending into the pine forests up to 4000 ft. elevation; also Ava and Chittagong.—Fl. CS.; Fr. HS.

N. B. A probably new species has been collected by Dr. Brandis somewhere in Pegu which is very near to *M. atropurpurea*, DC., and, indeed, has the same flowers. It differs in the long cuspidate leaflets, slender and short racemes, the lower persistent bracts, which are concave-ovate, long-acuminate, and about an inch long; and the lanceolate, acuminate calyx-lobes.

6. *M. NIVEA*, DC. Prod. II. 406; Hf. Ind. Fl. II. 188. (*Carpopogon niveum*, Roxb. Fl. Ind. III. 285).

HAB. Ava (*teste* Baker).

#### *Pachyrrhizus*, Rich.

1. *P. BULBOSUS*, (*Dolichos bulbosus*, L. sp. pl. 1020; Roxb. Fl. Ind. III. 309; *P. angulatus*, Rich. ap. DC. Mém. Leg. IX 379; DC. Prod. II. 402; Hf. Ind. Fl. II. 207).

HAB. Frequently cultivated all over Burma.—Fl. Close of R. S. and CS.; Fr. CS.

#### *Vigna*, Savi.

##### *Conspectus of Species.*

\* *Stipules not peltately attached. Keel prolonged into a distinct beak.*

× Ovary and pods (at least while young) more or less pubescent to tomentose. Flowers purple or blue.

O Seeds velvety.

Habit of the following; pods 2—3 in. long by  $\frac{1}{2}$  broad, densely silky villous, .. *V. dolichoides*.

O O Seeds glabrous.

Flowers about  $\frac{1}{2}$  in. long, forming short-peduncled many-flowered racemes; pods densely brown hirsute, 2 $\frac{1}{2}$ —3 lin. broad by 4—5 in. long, ..... *V. pilosa*.

Flowers about an inch long or longer, by 2—4 terminating the long peduncles; pod glabrescent, ..... *V. vexillata*.

× × Ovary and pods glabrous. Flowers yellow.

O Leaflets obovate, blunt or almost retuse.

Quite glabrous; corolla about  $\frac{1}{2}$  in. long; pods 1—1 $\frac{1}{2}$  in. long, ..... *V. lutea*.

O O Leaflets from ovate to ovate-lanceolate, acuminate to acute.





Flowers by 1—2 on very short paired peduncles, ..... *V. repens*.  
 Racemes many-flowered, long-peduncled; stipules small, almost peltately falcate-ovate,  
 .. *V. luteola*.

\* \* *Stipules peltately attached, the lower end produced.*

× Keel not prolonged into a beak. Flowers yellow.

Pods 1—2 in. long by  $1\frac{1}{2}$ —2 lin. broad, minutely puberulous, soon glabrous; seeds  
 glossy; stipules oblong, the produced basal part falcate-ovate, ..... *V. calcarata*.

Pods rather blunt at both ends, up to an in. long by  $2\frac{1}{2}$  lin. broad, sparingly but long-  
 hirsute; seeds opaque; stipules peltately linear-oblong, 3—4 lin. long,  
 .. *V. brachycarpa*.

× × Keel prolonged into a distinct beak. Flowers blue or white, or  
 variegated in these colours.

Pods 2—3, or 4—12 in. long by 2—4 lin. broad, glabrous; stipules shortly peltate,  
 lanceolate, ..... *V. Sinensis*.

1. *V. DOLICHOIDES*, Bak. in Hf. Ind. Fl. II. 206. (*Phaseolus doli-  
 choides*, Roxb. Fl. Ind. III. 290; *Canavalia dolichoides*, Kurz in Journ.  
 As. Soc. Beng. 1874. 185. sub No. 14).

HAB. Not unfrequent in the upper mixed forests of Chittagong and  
 Arracan, especially along choungs.—Fl. Close of RS.; Fr. DS.

2. *V. PILOSA*, Bak. in Hf. Ind. Fl. II. 207. (*Dolichos pilosus*,  
 Klein in Willd. sp. pl. III. 1043; Roxb. Fl. Ind. III. 312).

HAB. Prome (Wall. Cat. 5599 C.); Pegu, above Rangoon (Cleg-  
 horn).—Fl. Close of RS.; Fr. CS.

3. *V. VEXILLATA*, Bth. in Mart. Fl. Bras. XXIV. 194. t. 50. f. 1.;  
 Hf. Ind. Fl. II. 206. (*Phaseolus vexillatus*, L. sp. pl. 1017; Jacq. Hort.  
 Vindob. t. 102; *V. hirta*, Hook. Icon. plant. t. 637; *Phaseolus Pulniensis*,  
 Wight Icon. t. 202).

HAB. Rather scarce in savannahs along the choungs in the upper  
 mixed forests of the Pegu Yomah.—Fl. CS.

4. *V. LUTEA*, A. Gray in Bot. Amer. Expl. I. 454; Bth. Fl. Austr.  
 II. 259; Hf. Ind. Fl. II. 205.

HAB. Frequent on the sand-beaches and in the beach-forests all along  
 the coast of Tenasserim and the Andamans.—Fl. C. and HS.; Fr. HS.

5. *V. REPENS*, Bak. in Hf. Ind. Fl. II. 205.

HAB. Prome (Wall.). Not seen by me.

6. *V. LUTEOLA*, Bth. in Mart. Fl. Bras. Pap. 194. t. 50. f. 2 and Fl.  
 Austr. II. 260. (*Dolichos luteolus*, Jacq. Hort. Vindob. I. 39. t. 90; *Do-  
 lichos Gangeticus*, Roxb. Fl. Ind. III. 310).

HAB. Ava, Bhamo (J. Anderson).—Fl. Febr.

Baker refers my Burmese specimens (No. 2526) to this species, but  
 they differ greatly in the stipules, and are referred by me to the following  
 species.

7. *V. CALCARATA*, (*Phaseolus calcaratus*, Roxb. Fl. Ind. III. 289;  
 WA. Prod. I. 245; Hf. Ind. Fl. II. 203?).





HAB. Common in the savannahs and in grass-land, also amongst sunny shrubbery and in cultivated lands, all over Pegu, Arracan, and Martaban.—Fl. Fr. DS.

S. V. BRACHYCARPA, Kurz in Journ. As. Soc. Beng. 1874. 185; Hf. Ind. Fl. II. 206.

HAB. Arracan, upper mixed forests in the Akyab District.—Fl. Fr. Close of RS.

\*9. V. SINENSIS, Savi Dissert.; Miq. Fl. Ind. Bat. I. 187. (*Dolichos Sinensis*, L. Amoen. Acad. IV. 326; Roxb. Fl. Ind. III. 302; WA. Prod. I. 251; Bot. Mag. t. 2232; *Dolichos Tranquebaricus*, Jacq. Hort. Vindob. III. t. 70; *Dolichos Catjang*, L. Mart. 259; Roxb. Fl. Ind. III. 303; *V. Catjang*, Endl. ap. Miq. Fl. Ind. Bat. I. 188; Hf. Ind. Fl. II. 205).

HAB. Generally cultivated all over Burma and adjacent islands.—Fl. Fr. DS.

### Phaseolus, L.

#### Conspectus of Species.

Subg. 1. *Eu-phaseolus*. Stipules small, basifix and not or hardly produced downwards.

- \* *Pods dimidiate, oblong or linear, 2—many-seeded. Flowers purple to lilac and white.*

Flowers small, greenish white, on filiform puberulous pedicels; calyx shallow, 2 lin. wide and barely a line deep; pods falcate, 2—3 in. long by  $\frac{1}{2}$  broad, glabrous, *P. lunatus*.

Flowers purplish, middling sized, on slender glabrous pedicels; calyx about 2 lin. deep and nearly as wide, ribbed; pods  $1\frac{1}{2}$ —2 in. long by 3—4 lin. broad, *P. tenuicaulis*.

- \* \* *Pods neither dimidiate nor falcate, linear to narrow-linear, 4—many-seeded. Flowers purple to white.*

× Bractlets oval, persistent, as long as or longer than the calyx.

Racemes few-flowered; pedicels longer than the calyx; pods linear, 4—6-seeded, *...P. vulgaris*.

× × Bractlets deciduous, shorter than the calyx. Flowers shortly pedicelled.

Corolla nearly an inch long; calyx plain; pods many-seeded,  $\frac{1}{2}$  in. broad,

*...P. adenanthus*.

Corolla about  $\frac{1}{2}$  in. long; calyx almost 5-ribbed; pods many-seeded, 2 lin. broad or narrower, *...P. semierectus*.

Subg. 2. *Strophostyles*, Ellis. Stipules peltately attached and produced downwards. Flowers yellow or greenish yellow. Bracts very deciduous.

- \* *Ovary and pods glabrous.*

Prostrate or half-twining; stipules large and leafy, about  $\frac{1}{2}$  in. long; leaflets more or less deeply lobed, *...P. trilobus*.

- \* \* *Ovary pubescent to hirsute.*

Twining, the stems spreadingly hirsute; pedicels 1— $1\frac{1}{2}$  lin. long; pods thinly and shortly hirsute, *...P. trinervius*.





Erect or nearly so, hirsute to almost glabrous; flowers almost sessile; pods sparingly but long-hirsute, ..... *P. radiatus*.

\*1. *P. LUNATUS*, L. sp. pl. 1016; Roxb. Fl. Ind. III. 286; Wight Icon. t. 755; Bak. in Fl. trop. Afr. 193 and Ind. Fl. II. 200.

HAB. Ava, apparently cultivated.—Fl. Febr.

2. *P. TENUICAULIS*, Bak. in Hf. Ind. Fl. II. 201. (*Dolichos tenuicaulis*, Grah. in Wall. Cat. 5598 D.)

HAB. Prome (Wall.); Ava, hills east of Bhamo (J. Anderson).—Fl. Aug.

\*3. *P. VULGARIS*, L. sp. pl. 1016; Roxb. Fl. Ind. III. 287; Bth. in Mart. Fl. Bras. Papil. 182; Hf. Ind. Fl. II. 200.

Var.  $\beta$ . *NANUS*, Koch. Syn. Fl. Germ. I. 178. (*P. nanus*, L. sp. pl. 1017; Roxb. Fl. Ind. II. 291; WA. Prod. I. 243), dwarf and erect.

HAB. Here and there cultivated in gardens, chiefly in Chittagong.

4. *P. ADENANTHUS*, E. Mey. Prim. Flor. Esseq. 239; Bak. in Fl. trop. Afr. II. 192 and Ind. Fl. II. 200. (*P. rostratus*, Wall. Pl. As. rar. I. t. 63; Wight Icon. t. 34; *P. alatus*, Roxb. Fl. Ind. III. 288, non L.).

HAB. Ava and Prome, on the hills bordering the Irawaddi (Wall.); Tenasserim (Helf.).—Fl. Close of RS. and CS.; Fr. HS.

5. *P. SEMIERECTUS*, L. sp. pl. 1016; Jacq. Icon. t. 558; Bot. Reg. t. 743; Hf. Ind. Fl. II. 201. (*P. psoraleoides*, WA. Prod. I. 246; Wight Icon. t. 249).

HAB. Chittagong, in grass-land.—Fl. CS.; Fr. C. and HS.

6. *P. TRILOBUS*, Ait. Hort. Kew. III. 30; Roxb. Fl. Ind. III. 298; Wight Icon. t. 94; Hf. Ind. Fl. II. 201. (*Glycine triloba*, L. Mant. 516; *Dolichos trilobatus*, L. Mant. 516; Burm. Fl. Ind. t. 50. f. 1).

HAB. Burma (according to Revd. F. Mason).

7. *P. TRINERVIUS*, Heyne ap. WA. Prod. I. 245; Bak. in Fl. trop. Afr. II. 193 and in Ind. Fl. II. 203.

HAB. Not unfrequent in the savannahs of Martaban, east of Toung-hoo, and elsewhere; also Upper Tenasserim.—Fl. Fr. March, Apr.

\*8. *P. RADIATUS*, L. sp. pl. 1017; Roxb. Fl. Ind. III. 296; Miq. Fl. Ind. Bat. I. 197.

Var.  $\alpha$ . *RADIATUS*, (*T. radiatus*, L. l. c.; *P. Mungo*, L. var. *radiatus*, Bak. in Hf. Ind. Fl. II. 203), more or less spreading and twining; pods shorter and more blunt.

Var.  $\beta$ . *MUNGO*, (*P. Mungo*, L. Mant. 101; Roxb. Fl. Ind. III. 292; Hf. Ind. Fl. II. 203; *P. max*, Roxb. Fl. Ind. III. 295), dwarf and erect; pods longer, narrower, and acuminate; seeds green or black. Of this there is also an almost glabrous form.

HAB. Var.  $\beta$ . generally cultivated all over Burma.—Fl. CS.; Fr. Begin of HS.



**Dolichos, L.***Conspectus of Species.*

Flowers by 1—3 clustered in the leaf-axils; calyx-teeth about so long as the tube;  
corolla yellow,..... *D. biflorus*.

Flowers by 1 or 2 on a short axillary peduncle; calyx-teeth shorter than the tube;  
corolla reddish?..... *D. lanceolatus*.

1. *D. BIFLORUS*, L. sp. pl. 1023; Roxb. Fl. Ind. III. 313; Hf. Ind. Fl. II. 210. (*Glycine uniflora*, Dalz. in Journ. Linn. Soc. XIII. 146 cum icon.).

HAB. Ava (*teste* Baker).

2. *D. LANCEOLATUS*, Grah. in Wall. Cat. 5547; Hf. Ind. Fl. II. 210.

HAB. Prome Hills (Wall.).—Fl. Sept. Octob.

**Lablab, Savi.**

\*1. *L. VULGARIS*, Savi Dissert. 19. f. 8. a—c.; Wight Icon. t. 57. and 203. (*Dolichos Lablab*, L. sp. pl. 1019; Roxb. Fl. Ind. III. 305; Bot. Mag. t. 896; Hf. Ind. Fl. II. 209.; *Dolichos purpureus*, L. sp. pl. 1021; Smith Exot. Fl. t. 74; Bot. Reg. t. 830; *Dolichos Bengalensis*, Jacq. Hort. Vindob. II. t. 124; *Dolichos lignosus*, Roxb. Fl. Ind. III. 307; Bot. Mag. t. 380).

HAB. Generally cultivated in several varieties all over Burma and the adjacent islands.—Fl. Fr. CS.

**Psophocarpus, Neck.***Conspectus of Species.*

Bractlets shorter than the calyx; pods up to a foot long, 12—16 seeded,

... *P. tetragonolobus*.

Bractlets as long or longer than the calyx; pods 2—3 in. long, often only 5—6-seeded,

... *P. palustris*.

\*1. *P. TETRAGONOLOBUS*, DC. Prod. II. 403; Hf. Ind. Fl. II. 211. (*Dolichos tetragonolobus*, L. sp. pl. 1021?).

HAB. Prome and Martaban; cultivated accord. Revd. F. Mason.

\*2. *P. PALUSTRIS*, Desv. in Ann. d. sc. nat. IX. 420; Hf. Ind. Fl. II. 212. (*Diesingia scandens*, Endl. Atakt. I. t. 1—2; *P. longepedunculatus*, Hassk. Pl. Jav. rar. 388; Bak. in Fl. trop. Afr. II. 208; *Dolichos tetragonolobus*, Roxb. Fl. Ind. III. 305, non Linn.?).

HAB. Frequently cultivated all over Burma; growing also like wild in the savannahs around villages along the Irrawaddi river.—Fl. Oct. Jan.; Fr. C. and HS.



**Canavalia, Adans.***Conspectus of Species.*

*Subg. 1. Eu-canavalia.* Pods more or less dimidiate, with 2 parallel wings along the upper suture, glabrous or glabrescent.

\* *Seeds an inch long or slightly longer.*

Pods  $\frac{1}{2}$ —2 feet long, linear-oblong; seeds red or white, ..... *C. ensiformis*.

\* \* *Seeds only  $\frac{1}{2}$  in. long.*

Leaflets shortly acuminate or apiculate; standard an inch long; seeds light grey, ..... *C. virosa*.

Leaflets apiculate; standard  $\frac{3}{4}$  in. long or shorter; seeds dark brown, ..... *C. turgida*.

Leaflets oboval, retuse or rounded; standard an inch long; seeds grey, .. *C. obtusifolia*.

*Subg. 2. Dysolobium, Bth.* Pods terete, straight or slightly curved, obtusely 2-keeled along both sutures, but not winged, densely hirsute to velvety.

Shortly pubescent; corolla an inch long or longer; style bearded; pods velvety, *C. grandis*.

Glabrescent; corolla hardly  $\frac{1}{2}$  in. long; pod as in preceding, but more densely velvety, style villous round the stigma, ..... *C. lucens*.

\*1. *C. ENSIFORMIS*, DC. Prod. II. 404; Bot. Mag. t. 4027; Bak. in Fl. trop. Afr. II. 190 and Ind. Fl. II. 195. (*Dolichos ensiformis*, L. sp. pl. 1022; *C. gladiata*, DC. l. c.; Wight Icon. t. 753; *Dolichos gladiatus*, Jacq. Icon. rar. III. t. 560; Roxb. Fl. Ind. III. 300).

Var.  $\alpha$ . *ERYTHROSPERMA*, Voigt Hort. Calc. 234, seeds red; flowers red or white.

Var.  $\beta$ . *LEUCOSPERMA*, Voigt Hort. Calc. 234, seeds and flowers white; pods about 2 feet long.

HAB. Generally cultivated all over Burma, especially in the plains; often springing up in poonzohs and neglected gardens.—Fl. RS.; Fr. CS.

2. *C. VIROSA*, WA. Prod. I. 253; Miq. Fl. Ind. Bat. I. 216. (*Dolichos virosus*, Roxb. Fl. Ind. III. 301; *C. ensiformis*, var. 1. *virosa*, Bak. in Hf. Ind. Fl. II. 196).

HAB. Amongst shrubbery along the outskirts of the upper mixed forests along the Arracan coast, and most probably elsewhere.—Fl. Close of RS.; Fr. Jan.

3. *C. TURGIDA*, Grah. in Wall. Cat. 5534; Miq. Fl. Ind. Bat. I. 215. (*C. ensiformis*, var. 2. *turgida*, Bak. in Hf. Ind. Fl. II. 196).

HAB. Frequent in the leaf-shedding forests, and more especially in shrubbery along streamlets, in hedges, etc., all over Burma, from Chittagong and Prome down to Tenasserim and the Andamans.—Fl. Close of RS.; Fr. CS.

4. *C. OBTUSIFOLIA*, DC. Prod. II. 404; Clegh. in Madr. Journ. new ser. I. t. 4; Hf. Ind. Fl. II. 196. (*Dolichos rotundifolius*, Vhl. Symb. II. 81; Roxb. Fl. Ind. III. 302).

HAB. Common on the sand-beaches all along the coasts of Arracan and the Andamans.—Fl. Close of RS.; Fr. CS.



5. *C. GRANDIS*, Kurz in Journ. As. Soc. Beng. 1874. 185 sub No. 14. (*Phaseolus grandis*, Wall. Cat. 5602; Bth. in Pl. Jungh. I. 239 in adn.; *Phaseolus velutinus*, Bak. in Hf. Ind. Fl. III. 204).

HAB. Chittagong; Ava, Taong-dong and Khakyen hills; Tenasserim, Moulmein; Pegu (*teste* Baker).—Fl. Close of RS.; Fr. HS.

6. *C. LUCENS*, Kurz in Journ. As. Soc. Beng. 1874. 185 sub No. 14. (*Phaseolus lucens*, Wall. Cat. 5601; Bth. in Pl. Jungh. I. 239 in adn.; *Vigna lucens*, Bak. in Hf. Ind. Fl. II. 207).

HAB. Frequent in the mixed forests, especially the upper ones, entering also the tropical forests, from Chittagong, Pegu, and Martaban down to Tenasserim.—Fl. Close of RS.; Fr. HS.

### Dioclea, HBK.

1. *D. REFLEXA*, Hook. Fl. Nigr. 306; Bak. in Fl. trop. Afr. II. 189; Hf. Ind. Fl. II. 196. (*Dolichos hexandrus*, Roxb. Hort. Bengh. 55. and MS. Icon. XX. t. 134).

HAB. Tenasserim (Helf. 1752).

### Pueraria, DC.

#### *Conspectus of Species.*

*Subg. 1. En-pueraria.* Woody leaf-shedding climbers. Pods constricted between the seeds. Roots large, tuberous. Flowers pale blue.

Calyx densely silky; bractlets minute; pods tawny hirsute while young, .. *P. tuberosa*.

Calyx minutely appressed pubescent; bractlets as long as the buds; pods minutely appressed pubescent, soon glabrous, ..... *P. Candollei*.

*Subg. 2. Neustanthus*, Bth. Undershrubs or shrubs, erect or twining. Pods not constricted between the seeds.

\* *Erect shrubs or undershrubs, the branchlets terete or nearly so.*

× Bracts deciduous.

Tomentum of young parts, inflorescence, and calyx tawny; pods 2—3 in. long,

... *P. composita*.

All parts nearly glabrous; calyx minutely velvety; pods 1½—2 in. long; flowers white,

... *P. Wallichii*.

× × Bracts persistent.

Leaves sparingly appressed hirsute; fruiting pedicels 2 lin. long; pods 1—1½ in. long, glabrous, ..... *P. stricta*.

\* \* *Twining or prostrate herbs or undershrubs. Flowers purplish blue.*

× Pods narrowly linear, 1½—3 in. long by 2 lin. broad, many-seeded.

O Bracts deciduous. Branchlets terete or nearly so. Leaflets often lobed. Extensive twiners (*Schizophyllum*, Baker.)

Calyx about 2½ lin. long, the lobes acuminate; corolla about 5 lin. long, *P. phaseoloides*.

Calyx about 4 lin. long, the lobes subulate-acuminate; corolla ½ in. long,

... *P. subspicata*.

O O Bracts persistent. Branchlets somewhat angular. Prostrate or twining perennial herbs.



Pods long but thinly hirsute,..... *P. anabaptista*.  
 × × Pods oblong to linear-oblong,  $\frac{1}{2}$ —1 in. long by  $2\frac{1}{2}$ — $3\frac{1}{2}$  lin. broad,  
 flat or torose. Branchlets sharply angular, retrorsely pubescent on  
 the angles.

Pods flat or nearly so, sparingly but long and spreadingly hirsute, 2—4-seeded; calyx  
 small, ..... *P. hirsuta*.

Pods torose, shortly and sparingly appressed hirsute, 5—6-seeded; calyx nearly a line  
 long,..... *P. brachycarpa*.

1. *P. TUBEROSA*, DC. Prod. II. 240; Wight Icon. t. 412; Hf. Ind.  
 Fl. II. 197. (*Hedysarum tuberosum*, Roxb. Fl. Ind. III. 363).

HAB. Chittagong.—Fl. March, Apr.; Fr. May, June.

2. *P. CANDOLLEI*, Grah. in Wall. Cat. 5355; Hf. Ind. Fl. II. 197.

HAB. Common in the mixed forests, especially the upper ones, all  
 over Burma, from Ava and Martaban down to Tenasserim.—Fl. March.  
 Apr.; Fr. May, June.

Stands in a similar relationship to the preceding species as *Millettia*  
*extensa* does to *M. macrophylla*, and is barely more than a glabrous variety  
 of it.

3. *P. WALLICHII*, DC. Prod. II. 240, and Mém. Legum. t. 43; Hf.  
 Ind. Fl. II. 198.

Var.  $\alpha$ . *GENUINA*, all parts nearly glabrous; calyx minutely velvety;  
 pods  $1\frac{1}{2}$ —2 in. long; flowers white.

Var.  $\beta$ . *COMPOSITA*, Bth. in Linn. Proc. IX. 124. (*P. composita*,  
 Grah. in Wall. Cat. 5570), tomentum of the young parts, and of the inflo-  
 rescence and calyx, of a tawny colour; pods 2—3 in. long; flowers appa-  
 rently purple.

HAB. Var.  $\alpha$ . Burma (*teste* Benth.); var.  $\beta$ . frequent in the drier  
 hill-forests, especially the pine-forests, of Martaban, east of Tounghoo, at  
 3500 to 5000 feet. elevation; Ava, Taong-dong (Wall).—Fr. March.

I think that var.  $\beta$ . will have to be separated specifically.

4. *P. STRICTA*, Kurz in Journ. As. Soc. Beng. 1873, 254; Hf. Ind.  
 Fl. II. 198.

HAB. Rather frequent in the hill-eng and the upper dry-forests, rare  
 in the drier upper mixed forests of the Pegu Yomah and the Martaban hills,  
 at 1000—3000 feet elevation.—Fr. DS.

5. *P. PHASEOLOIDES*, Bth. in Proc. Linn. Soc. IX. 125; Hf. Ind.  
 Fl. II. 199 excl. syn. Bth. (*Dolichos phaseoloides*, Roxb. Fl. Ind. III. 316).

HAB. In hedges and light woods of Pegu (Maclelland); Promo  
 (Wall.); probably all over the country.—Fl. Close of RS.; Fr. DS.

6. *P. SUBSPICATA*, Bth. in Proc. Linn. Soc. IX. 125.

HAB. Frequent in the mixed, especially the savannah-forests, of Arra-  
 can and Pegu; also Tenasserim, Tavoy.—Fl. Close of RS.; Fr. CS.

7. *P. ANABAPTISTA* (*Shuteria hirsuta*, Bak. in Hf. Ind. Fl. II. 182?).





Var.  $\alpha$ . GENUINA, branches, petioles, etc., spreadingly tawny hirsute; pods similarly hirsute while unripe; flowers purple.

Var.  $\beta$ . GLABRESCENS, branches, petioles, and also the pods thinly appressed hirsute, the last shorter and almost glabrescent; flowers pale lilac, violet at the tips.

HAB. Both varieties rather frequent in the upper mixed forests, along choungs, also in hill-toungyas, of the Pegu Yomah; also Ava, Khakyen Hills.—Fl. begin of CS.; Fr. HS.

Var.  $\beta$ . may be distinct and stands in a similar relation to the normal form as *P. Candollei* does to *P. tuberosa*. The species is also common in the Sikkim Himalaya.

S. *P. HIRSUTA*, Kurz in Journ. As. Soc. Beng. 1873, 254; Hf. Ind. Fl. II. 199.

HAB. Not rare in the drier upper mixed forests of the western slopes of the Pegu Yomah, up to 3000 feet elevation.—Fr. Jan.

9. *P. BRACHYCARPA*, Kurz in Journ. As. Soc. Beng. 1873. 232 and 1874. 185; Hf. Ind. Fl. II. 199.

HAB. Rare in the drier upper mixed forests of the central parts of the Pegu Yomah.—Fr. Jan.

### **Teramnus, Spreng.**

#### *Conspectus of Species.*

\* *Pods more or less torose, tawny hirsute.*

Seeds opaque; inflorescence and young branches spreadingly tawny pilose; calyx-teeth as long as the tube, ..... *T. mollis*.

\* \* *Pods glabrous to the naked eye.*

× Flowers in racemes.

Racemes appressed silk-hairy; calyx-teeth as long as the tube; seeds glossy; leaflets up to  $1\frac{1}{2}$  in. long, not acuminate, ..... *T. labialis*.

Racemes long-peduncled, almost glabrous; leaflets obovate, retuse, ..... *T. Wallichii*.

Racemes appressed silk-hairy; calyx-teeth shorter than the calyx-tube; seeds quite opaque; leaves 2—4 in. long, acuminate, ..... *T. flexilis*.

× × Flowers by 2—4, axillary.

Habit of *T. flexilis*; corolla  $\frac{1}{2}$  in. long; unripe pods  $1\frac{1}{2}$  in. long, flat glabrous.

.. *T. oxyphylla*.

1. *T. MOLLIS*, Bth. in Linn. Proc. VIII. 265. (*Glycine mollis*, WA. Prod. I. 208; *Glycine debilis*, Roxb. Fl. Ind. III. 317, *viz* Aiton).

HAB. Frequent in the drier upper mixed forests all over the Pegu Yomah.—Fl. RS.; Fr. CS.

2. *T. LABIALIS*, Spreng. Syst. veget. II. 235; Bth. in Linn. Proc. VIII. 265; Hf. Ind. Fl. II. 184, in part. (*Glycine labialis*, L. suppl. 325; Roxb. Fl. Ind. III. 315; Wight Leon. t. 168).

HAB. Frequent in savannahs and savannah-forests, also in hedges,



shrubby and neglected culture-land, of Chittagong and Arracan; probably also elsewhere.—Fl. Fr. RS.

3. *T. WALLICHII*, (*Desmodium Rottleri*, Bak. in Hf. Ind. Fl. II. 174 quoad plant. e Prome).

HAB. Prome Hills (Wall. Cat. 5974).

The few specimens seen by me are imperfect, but the terete stems, and more especially the large peculiar peltately adnate stipules, at once remove it from *Desmodium Rottleri*, with which Baker identifies the plant.

4. *T. FLEXILIS*, Bth. in Linn. Proc. VIII. 265; Hf. Ind. Fl. II. 185.

HAB. Not unfrequent in the moister upper mixed and in the tropical forests of Chittagong, Arracan, and Southern Pegu to Tenasserim.—Fl. Close of RS.; Fr. CS.

5. *T. OXYPHYLLA*. (*Galactia? oxyphylla*, Bth. in Pl. Jungh. I. 253 in adn.; Hf. Ind. Fl. II. 192).

HAB. Tenasserim, Amherst (Parish); Tavoy (Gomez).

### Glycine, L.

#### Conspectus of Species.

Erect; flowers in small axillary clusters; pods 1—1½ in. long, almost falcate; seeds 3 lin. long, slightly compressed, pale coloured, ..... *G. Soja*.

Twining; flowers in peduncled axillary racemes; pods ½—1 in. long, straight; seeds a line long, compressed, brown, ..... *G. Jacanica*.

1. *G. SOJA*, Sieb. and Zucc. Fam. Nat. Fl. Jap. 11; Bth. in Linn. Proc. VIII. 266; Hf. Ind. Fl. II. 184. (*Dolichos Soja*, L. sp. pl. 1621; Roxb. Fl. Ind. III. 314; Jacq. Icon. rar. t. 145; *Soya hispida*, Moench Meth. 153; DC. Prod. III. 396; Alef. in Bot Ztg. 1867. 290).

HAB. Ava, cultivated.

### Dunbaria, WA.

#### Conspectus of Species.

##### \* Ovary and pods sessile.

Leaflets large, acuminate, sparingly but distinctly resinous-dotted beneath; flowers in racemes, ..... *D. fusca*.

Leaflets small, bluntish; flowers usually by pairs, ..... *D. conspersa*.

##### \* \* Ovary and pods conspicuously stalked.

Leaflets acuminate; flowers usually by pairs or few on a very short peduncle; pods pubescent, 1½—2 in. long, 10—12-seeded, long-stalked, ..... *D. podocarpa*.

Leaflets acute; flowers in racemes; pods spreadingly viscose-hairy, 1—1½ in. long, 5—6-seeded, shortly stalked, ..... *D. circinalis*.

1. *D. FUSCA*, Kurz in Journ. As. Soc. Beng. 1874, 186. (*Phaseolus fuscus*, Wall. Pl. As. rar. I. 6. t. 6; Hf. Ind. Fl. II. 204).

HAB. Prome Hills (Wall.).—Fl. Febr., March.

2. *D. CONSPERSA*, Bth. in Pl. Jungh. I. 241; Hf. Ind. Fl. II. 218. (*Dolichos? rhynchosioides*, Miq. Fl. Ind. Bat. I. 177).





HAB. Prome Hills (Wall.).—Fl. Sept. Octob.

3. *D. PODOCARPA*, Kurz in Journ. As. Soc. Beng. 1874, 185; Hf. Ind. Fl. II. 218.

HAB. Upper Tenasserim, Moulmein (Falconer; Helf. 1709).—Fl. Fr. Febr. March.

4. *D. CIRCINALIS*, Bak. in Hf. Ind. Fl. II. 219. (*Atylosia circinalis*, Bth. Pl. Jungh. I. 244 in adn.).

HAB. Tenasserim, Moulmein, etc., (Griff., Helf.) teste Baker.

I have seen no Burmese specimens of this species, which greatly resembles the preceding.

### *Atylosia*, WA.

#### *Conspectus of Species.*

• *Twining undershrubs or herbs.*

× Prostrate herb with twining branches. Flowers 3—4 lin. long, almost fasciated by 2—3.

Puberulous; pods  $\frac{1}{2}$ —1 in. long, tawny puberulous and hirsute, ..... *A. scarabæoides*.

× × Corolla  $\frac{1}{2}$ — $\frac{3}{4}$  in. long. Extensive twiners. Flowers racemose.

Leaflets shortly pubescent on both sides; racemes and pods long-pilose, the latter transversely torose, long-acuminate, ..... *A. barbata*.

Leaflets beneath softly (often yellowish) puberulous; pods oblong, transversely impressed between the seeds, yellowish or tawny velvety, ..... *A. mollis*.

• • *Erect shrubs or herbs.*

Stiff annual, little-branched; leaflets beneath closely white or yellowish tomentose; calyx slightly puberulous or almost glabrous; corolla  $\frac{1}{2}$  in. long, ..... *A. nivea*.

1. *A. SCARABÆOIDES*, Bth. in Pl. Jungh. I. 242; Hf. Ind. Fl. II. 215. (*Dolichos scarabæoides*, L. sp. pl. 1020; *Dolichos medicagineus*, Roxb. Fl. Ind. III. 315, non Willd.).

HAB. Ava, Bhamo (J. Anderson).—Fr. Jan.

2. *A. BARBATA*, Bak. in Hf. Ind. Fl. II. 216. (*Dunbaria barbata*, Bth. in Pl. Jungh. I. 242 in adn.; *Dunbaria calycina*, Miq. Fl. Ind. Bat. I. 180).

HAB. Frequent in all leaf shedding forests and in the savannahs, also in hedges, etc., all over Pegu and Martaban down to Tenasserim; also Ava and Prome.—Fl. Fr. C. and HS.

3. *A. MOLLIS*, Bth. in Pl. Jungh. I. 243 in adn.; Hf. Ind. Fl. II. 213. (*Dunbaria Horsfieldii*, Miq. Fl. Ind. Bat. II. 179).

HAB. Not unfrequent in the savannah forests, also in the open and the mixed forests, of Martaban and Ava; also Andamans.—Fl. CS.; Fr. HS.

4. *A. NIVEA*, Bth. in Pl. Jungh. I. 243 in adn.; Hf. Ind. Fl. II. 214.

HAB. Not unfrequent in the eng-forests of the Prome district; Ava, Yenang-choung (Wall.).



**Cajanus, DC.**

\* 1. *C. INDICUS*, Spreng. Syst. III. 248; Alef. in Bot. Zeitg. 1867. 289; Hf. Ind. Fl. II. 217. (*Cytisus cajan*, L. sp. pl. 1041; Roxb. Fl. Ind. III. 325; *Cytisus pseudo-cajan*, Jacq. Hort. Vindob. t. 119; *C. flavus*, DC. Prod. II, 402; Jacq. Obs. I. t. 1.).

HAB. Generally cultivated in several varieties all over Burma and the adjacent islands, up to 3000 feet elevation.—Fl. Fr. C. S.

**Cylista, Ait.**

1. *C. SCARIOSA*, Ait. Hort. Kew. IV. 513; Roxb. Corom. Pl. I. t. 92 and Fl. Ind. III. 320; Wight Icon. t. 1597; Hf. Ind. Fl. II. 219.

HAB. Frequent in the leaf-shedding forests, especially the mixed ones, also in deserted toungyas, savannahs, etc., all over Pegu and Martaban.—Fl. Close of RS; Fr. HS.

**Rhynchosia, Lour.***Conspectus of Species.*

*Subg. 1. Eu-Rhynchosia*, Seeds without arillus.

\* *Pods very much longer than the calyx.*

× Twining herbs.

Leaflets more or less acute; racemes elongate, longer than the leaves, almost glabrous,

...*R. minima*.

Leaflets obtuse or rounded; racemes filiform, shorter than the leaves, pilose; calyx-teeth filiform,.....*R. pilosa*

× × Erect shrubs or undershrubs.

Greyish velvety; racemes longer than the leaves, paniced at the end of the branches, pod densely velvety, .....*R. bracteata*.

\* \* *Calyx as long as the corolla, in fruit nearly as long as the pod. Twiners.*

Flowers in dense short axillary racemes; pods long-pilose, short, .....*R. densiflora*.

*Subg. 2. Phyllomatia*, WA. (incl. *Nomismia*, WA. and *Ptychocentrum*, WA.).

Seeds with a waxy arillus.

\* *Calyx-teeth broad, enlarging and leafy in fruit.*

Half-twining, thinly pubescent; flowers singly on the filiform viscid-pubescent racemes, pods 1-seeded, .....*R. rufescens*.

\* \* *Calyx-teeth lanceolate, acuminate, not enlarging.*

Erect; stems, racemes, and undersurface of leaflets white-tomentose; pods 2-seeded,

...*R. candicans*.

1. *R. MINIMA*, DC. Prod. II. 385; Bth. in Fl. Austr. II. 267; Hf. Ind. Fl. II. 223. (*Dolichos minimus*, L. sp. pl. 1020; *Dolichos scarabæoides*, Roxb. Fl. Ind. III. 315, non Willd.).

HAB. In the dry and open forests, also in savannahs, of Prome and Ava.—Fl. Fr. Close of RS.

2. *R. PILOSA*, Wall. Cat. 5499; Hf. Ind. Fl. II. 224.

HAB. Ava, banks of the Irrawaddi near Segain (Wall.).





The foliage resembles that of *Atylosia scarabæoides*, the flowers those of *Atylosia elongata*, Bth.

3. *R. BRACTEATA*, Bth. in Hf. Ind. Fl. II. 225.

HAB. Not unfrequent in the dry and eng-forests of the Prome district; Ava, Yenang-choung and Taong-dong (Wall.).—Fl. Fr. DS.

4. *R. DENSIFLORA*, DC. Prod. II. 386; Hf. Ind. Fl. II. 226. (*Dolichos aurantiacus*, Wall. Cat. 5492 E.).

HAB. Ava, limestone hills near Segain; Taong-dong (Wall.).—Fl. Nov.

5. *R. RUFESCENS*, DC. Prod. II. 387; Hook. Icon. t. 189; Hf. Ind. Fl. II. 220. (*Cyanospermum Javanicum*, Miq. Fl. Ind. Bat. I. 167).

HAB. Ava, Irrawaddi valley near Katha (J. Anderson).—Fl. Jan.

6. *R. CANDICANS*, (*Cajanus? candicans*, Wall. Cat. 5576; *Atylosia candicans*, Kurz in Journ. As. Soc. Beng. 1874, 186. (*R. Avensis*, Bth. MS.; Hf. Ind. Fl. II. 222; *Dolichos candicans*, Wall. Cat. 5567; Hf. Ind. Fl. II. 226, forma foliolis acutis v. obtusiusculis).

HAB. Ava, banks of the Irrawaddi below Yenang-choung; also Taong-dong (Wall.).—Fl. Nov.

#### *Flemingia*, Roxb.

#### *Conspectus of Species.*

*Subg. 1. Eu-Flemingia.* Erect shrubs or herbs. Flowers in racemes, panicles or head-like spikes.

§ 1. *Ostryodium*, DC. Racemes one-sidedly flowered, the upper ones collected into a terminal panicle. Floral bracts large, leafy, complicate, persistent. Leaves 1-foliolate. Pods 2-seeded.

× Floral bracts quite glabrous.

Corolla yellowish,  $\frac{1}{2}$  in. long; leaves cordate-ovate,.....*F. chappar.*

× × Floral bracts puberulous or pubescent.

Stipules not above 3 lin. long, rather deciduous; bracts rotundate and obsoletely pointed, not ciliate; corolla about 3 lin. long, white or yellowish, ..*F. strobilifera.*

Stipules stiff-subulate, up to  $\frac{1}{2}$  in. long; bracts more or less retuse, ciliate; corolla purplish, about 2 lin. long,.....*F. bracteata.*

§ 2. *Flemingiastrum*. DC. (incl. *Chalaris*, WA.). Racemes spikelike, solitary or clustered in the leaf-axils, or in panicles, rarely reduced to axillary or terminal more or less involucred heads.

× Flowers in racemes or panicles. Pods usually few-seeded.

+ Leaves 1—3-foliolate. Bracts small, persistent or deciduous (*Chalaris*, WA.).

Leaves 1-foliolate; racemes filiform, shorter than the leaves,.....*F. paniculata.*

Leaves 3-foliolate; racemes slender, as long or usually longer than the leaves,

...*F. lineata.*

+ + Leaves digitately 3-foliolate. Spikes, while young, densely imbricate-bracted, the bracts deciduous long before opening of the flowers, or rarely persistent.





O Bracts not scarious, shorter than, or about as long as the buds. Low shrubs, the branches more or less terete or angular.

† Bracts persistent during flowering time.

Racemes dense, sessile; corolla 3 lin. long; calyx-lobes subulate, the lower one  $2\frac{1}{2}$  lin. long; petioles less than an inch long, ..... *F. Grahamiana*.

Racemes dense, villous, the broad bracts much shorter than the pilose calyx; calyx-teeth 3— $3\frac{1}{2}$  lin. long, linear, subulate-acuminate; corolla slightly longer than the calyx; petiole 1—2 in. long, not winged, ..... *F. Wallichii*.

†† Bracts deciduous before opening of the flowers.

¶ Low shrubs with a woody subterranean trunk.

Racemes small, silvery silk-hairy; calyx-teeth falcately subulate, a line long, the lowermost one  $1\frac{1}{2}$  lin. long; corolla 2 lin. long; petiole winged, about an inch long, ..... *F. sericans*.

As preceding, but flowers somewhat larger and not silvery silk-hairy; petiole 3—6 in. long and longer, winged, ..... *F. nana*.

Racemes rather slender and lax; flowers almost sessile; corolla 2 lin. long or a little longer; calyx-teeth falcate-lanceolate, the lowermost one barely longer than the rest; petiole winged, 1—2 in. long, ..... *F. ferruginea*.

¶¶ Well-developed undershrubs.

Petiole usually not winged; racemes dense, usually clustered and shorter than the petiole, greyish silk-hairy; bracts linear-lanceolate, subulate-acuminate, about 4 lin. long; calyx  $3\frac{1}{2}$  lin. long, the lobes linear, subulate-acuminate, the lowermost much longer; corolla  $3\frac{1}{2}$  lin. long, purplish, with a flesh-coloured purplish-streaked standard, ..... *F. congesta*.

As preceding; racemes appressed tawny-pubescent, much shorter than the narrowly winged petiole; pods densely resinose-glandular and puberulous, ..... *F. prostrata*.

Petiole narrowly winged; racemes rather lax, greyish silk-hairy; calyx 3 lin. long, the lobes subulate; bracts ovate-lanceolate, cuspidate; corolla 3 lin. long, rose-coloured with greenish keel; pods puberulous, ..... *E. semialata*.

Petiole narrowly winged; bracts and calyx appressedly brown or golden silk-hairy, the latter  $\frac{1}{2}$  in. long, the lobes subulate with the lowermost one twice as long; corolla  $\frac{1}{2}$  in. long, white with rose-coloured wings, ..... *F. latifolia*.

O O Bracts scarious and stiff, very much longer than the flower buds. Branches and branchlets more or less triquetrous.

Tall undershrub; petiole narrowly winged; lower sheathing bracts up to 2 in. long; calyx about 4 lin. long, silvery silk-hairy, the lobes linear, acuminate, the lowermost one twice as long; corolla nearly  $\frac{1}{2}$  in. long; pods minutely appressed puberulous, ..... *F. stricta*.

× × Spikes short and condensed into heads. Bracts all persistent, the outer ones large and involucre-like. Pod enclosed in the calyx, 1-seeded. (*Lepidocoma*, Jungh.)

Erect undershrub; bracts silky-pilose; calyx  $\frac{1}{2}$  in. long, the lobes subulate; corolla  $\frac{1}{2}$  in. long, minutely appressed silk-hairy; pods silky-pilose, ..... *F. capitata*.

Subg. 2 *Rhynchosoides*, Bak. Twining herbs or perennials. Flowers in long peduncled heads or dichotomous corymbs. Calyx-teeth almost equal. Pods 1. rarely 2-seeded, usually included in the calyx. Bracts minute, deciduous.

Flowers by 4—10 in long-peduncled heads; calyx fulvous-pilose,  $\frac{1}{2}$  in. long; corolla appressed pilose, nearly  $\frac{1}{2}$  in. long, ..... *F. vestita*.



1. *F. CHAPPAR*, Ham. in Wall. Cat. 5757; Hf. Ind. Fl. II. 227.

HAB. Frequent in the eng- and dry forests of Ava, Prome, Pegu, and Martaban.—Fl. CS.; Fr. HS.

2. *F. STROBILIFERA*, RBr. in Ait. Hort. Kew. ed. 2. IV. 350; Wight Icon. t. 267; Bot. Reg. t. 617; Hf. Ind. Fl. II. 227. (*Hedysarum strobiliferum*, L. sp. pl. 1053; Roxb. Fl. Ind. III. 350).

HAB. Common in all leaf-shedding forests and in the savannahs, all over Burma, from Chittagong and Ava down to Tenasserim and the Andamans.—Fl. R. and CS.; Fr. HS.

3. *F. BRACTEATA*, Wight Icon. t. 268; Miq. Fl. Ind. Bat. I. 162. (*F. strobilifera* var. 1. *bracteata*, Bak. in Hf. Ind. Fl. II. 227; *Hedysarum bracteatum*, Roxb. Fl. Ind. III. 351).

HAB. Frequent in all leaf-shedding forests, especially the lower mixed and savannah forests, all over Burma, from Ava and Martaban down to Pegu.—Fl. Close of RS. and CS.; Fr. HS.

4. *F. PANICULATA*, Wall. Cat. 5759; Bth. in Pl. Jungh. I. 245 in adn.; Hf. Ind. Fl. II. 227.

HAB. Upper Tenasserim, Attaran river (Wall., Helf.).—Fl. CS.

5. *F. LINEATA*, Roxb. Fl. Ind. III. 341; Wight Icon. t. 327; Hf. Ind. Fl. II. 228. (*Hedysarum lineatum*, L. sp. pl. 1054; Burm. Fl. Ind. 167. t. 53. f. 1).

HAB. Common in the savannahs and the lower mixed forests, also in grass-lands, etc., all over Ava, Prome, and Pegu; also Martaban.—Fl. CS.; Fr. HS.

6. *F. SERICANS*, Kurz in Journ. As. Soc. Beng. 1874, 186.

HAB. Frequent in the eng-forests of Prome district and of Martaban, east of Tounghoo.—Fl. Fr. HS.

7. *F. FERRUGINEA*, Grah. in Wall. Cat. 5750; Bth. in Pl. Jungh. I. 245 in adn.

HAB. Prome, frequent in the eng-forests; Ava, Taong-dong (Wall.).—Fl. Fr. March.

Habit of *F. Wightiana*, but the flowers very small and the calyx perfectly different.

8. *F. CONGESTA*, Roxb. Hort. Bengh. 56 and Fl. Ind. III. 340; Wight Icon. t. 390; Miq. Fl. Ind. Bat. I. 164; Hf. Ind. Fl. II. 228.

HAB. Frequent in alluvial grass-lands, especially in the savannah-forests, all over Pegu and Martaban down to Tenasserim; also Ava.—Fl. Close of RS.; and CS.; Fr. C. and HS.

9. *F. PROSTRATA*, Roxb. Fl. Ind. III. 338; Bth. in Pl. Jungh. I. 245 in adn.

HAB. Not unfrequent in the drier hill- (especially the pine-) forests of the Martaban Hills, east of Tounghoo, at 4000 to 5000 feet elevation.—Fr. March.



The Burmese variety differs from Khasi specimens chiefly in the long-acuminate not wrinkled leaflets and the black-glandular pods.

10. *F. SEMIALATA*, Roxb. Fl. Ind. III. 340; Wight Icon. t. 726; WA. Prod. I. 241. (*F. congesta*, var. 1. *semialata*, Bak. in Hf. Ind. Fl. II. 229 in part).

Var.  $\alpha$ . *GENUINA*, racemes elongate, more robust.

Var.  $\beta$ . *VIRIDIS*, racemes simple, more lax and slender, more silk-hairy, always clustered in the axils of the leaves, and much shorter than the petiole; leaves of a thinner texture or less pubescent; flowers and pods usually smaller.

HAB. Var.  $\beta$ . only, but this common enough, in the leaf-shedding forests and in grassy or shrubby places, more especially in the savannahs, all over Burma, from Chittagong and Ava down to Tenasserim.—Fl. CS.; Fr. HS.

11. *F. LATIFOLIA*, Bth. in Pl. Jungh. I. 246; Miq. Fl. Ind. Bat. I. 163. (*F. congesta*, var. 2. *latifolia*, Bak. in Hf. Ind. Fl. II. 229).

Var.  $\alpha$ . *GENUINA*, racemes more lax and more slender, branched; flowers smaller.

Var.  $\beta$ . *GRANDIFLORA*, racemes simple, shorter and more dense; flowers about  $\frac{1}{2}$  larger.

HAB. Var.  $\beta$ . rather frequent in the hill-eng-forests and the drier hill- (chiefly the pine-) forests of the Martaban Hills, east of Tounghoo, at 2000—4000 feet elevation.—Fl. March.

12. *F. STRICTA*, Roxb. Corom. Pl. III. t. 248 and Fl. Ind. III. 342; Wight Icon. t. 329; Hf. Ind. Fl. II. 228.

HAB. Not unfrequent in the open forests, especially the low and eng-forests, of Pegu; also Chittagong, Ava, and Tenasserim.—Fl. CS.

13. *F. CAPITATA*, Zoll. in Natuurk. en Geneesk. Arch. III. 64; Miq. Fl. Ind. Bat. I/2. 166. (*F. involucrata*, Bth. in Pl. Jungh. I. 246; Hf. Ind. Fl. II. 229; *Lepidocoma trifoliatum*, Jungh. in Topogr. Naturw. Reise, Java, 338 and in Flora 1847. 508.)

HAB. Frequent in the open, especially the low forests, all over Pegu; also in Martaban, where it ascends into the drier hill-forests; Upper Tenasserim.—Fl. Fr. CS.

*F. procumbens* of the Kew Herbarium, from Concan (Stocks; Wight No. 806), has nothing to do with Roxburgh's plant and appears to me to be a new species of *Lepidocoma*, probably connecting that genus with *Rhynchosoides*.

\*14. *F. VESTITA*, Bth. in Hf. Ind. Fl. II. 230. (*Dolichos vestitus*, Grah. in Wall. Cat. 5545; *Rhynchosia vestita*, Bth. MS.).

HAB. Sometimes cultivated by the Karens of the Martaban Hills, at 3000 to 5000 feet elevation.



**Eriosema, DC.**

1. *E. TUBEROSUM*, (*Crotalaria tuberosa*, Ham. in Don Prod. Nap. 241; DC. Prod. II. 129; *E. Chinense*, Vog. in Pl. Meyen. 31; Bth. Fl. Austr. II. 268; Hf. Ind. Fl. II. 219).

HAB. Frequent in the open, especially the eng-forests, all over Prome and Pegu; also Martaban, here ascending into the drier hill-forests up to 4000 feet elevation.—Fl. Close of RS.; Fr. CS.

**Crotalaria, L.***Conspectus of Species.***A. SIMPLICIFOLLE.** Leaves simple.

\* Ovary and pods glabrous.

+ Racemes lateral and leaf-opposed.

× Stipules none or small, not decurrent.

O Almost glabrous. Slender erect annuals.

Stipules half-lunate, persistent, ..... *C. filiformis*.

Stipules very minute, deciduous, ..... *C. Stocksii*.

O O Silk-hairy or pilose.

† Prostrate or ascending small herbs; flowers not above 2½ lin. long.

Bracts subulate, very minute; stipules none; pods 15—30-seeded, ..... *C. prostrata*.

Bracts subulate, minute; stipules minute, subulate; pods 6—8-seeded, .. *C. humifusa*.

Bracts lanceolate, a line long; stipules subulate, minute; pods 12—15-seeded, ..... *C. acicularis*.

†† Flowers ½—¾ in. long. Erect branched annuals.

Tawny pilose; stipules lanceolate, spreading; pod 20—30-seeded, ..... *C. ferruginea*.

× × Stipules decurrent and forming leafy wings to the branches.

Erect annual; flowers middling-sized, yellow; pods stalked, ..... *C. alata*.

+ + Racemes terminal or terminating axillary branchings. More or less hairy, hirsute or appressed silk-hairy, rarely glabrous.

O Calyx divided to the base into lobes, of which especially the 2 upper ones much enlarge in fruit.

† Pod exserted from the calyx.

Flowers ½ in. long, pale yellow, racemose; bracts linear, very minute; pods 1½—2 times longer than the calyx, ½—¾ in. long, ..... *C. albida*.

†† Pod more or less included and shorter than the calyx, (*Calycinae*.)

¶ Pod small, globular or ovoid-globose, sessile.

Small herb; racemes shortened and head-like ..... *C. nana*.

Erect annual of several feet; racemes elongate, ..... *C. linifolia*.

¶¶ Pods linear-oblong to oblong.

Δ Flowers yellow or pale yellow.

Flowers few, in short lax racemes; fruiting calyx covered with long coppery brown soft hairs; pods an inch long; bracts and bractlets large, lanceolate, .. *C. calycina*.

Flowers in dense heads; calyx and pod ¼ in. long; bracts and bractlets large, ovate, acuminate, ..... *C. dubia*.

Flowers? yellow, capitate; calyx and pods ¼—½ in. long; bracts and bractlets linear, ..... *C. Chinensis*.





△ △ Flowers blue.

Flowers in long racemes; bracts and bractlets long, setaceous; calyx  $\frac{1}{4}$ — $\frac{1}{2}$  in. long; pods  $\frac{1}{2}$  in. long, ..... *C. sensitiflora*.

O O Pods very much exerted from the calyx. Calyx-tube obliquely bell-shaped, the teeth rather short, barely enlarging in fruit.

¶ Bracts subulate, very minute. Flowers yellow.

△ Branches and branchlets woody, with medullary pith, terete.

Almost glabrous; leaves acute; racemes terminating axillary branchlets or reduced to axillary flower-clusters, ..... *C. Kurzii*.

△ △ Branches herbaceous, fistulose, stout.

Calyx and underside of the blunt or acute leaves densely appressed silky; racemes all terminal, ..... *C. Assamica*.

Thinly appressed silk-hairy; leaves retuse to blunt; racemes all terminal, .... *C. retusa*.

¶ ¶ Bracts ovate to ovate-lanceolate, up to 4 lin. long, reflexed.

Glabrous; leaves blunt to acute, almost sessile, glaucous-green; pods stalked; branches stout, fistulose, ..... *C. sericea*.

\* \* Ovary variously clothed, from villose to tomentose and appressed silk-hairy. Pods similarly clothed, rarely minutely pubescent and appearing glabrous to the naked eye. (Flowers racemose.)

+ Stipules none, or small and subulate. Flowers yellow.

× Pods minutely appressed-pubescent, appearing glabrous to the naked eye. Calyx glabrous. Leaves narrow.

Glabrous; bracts linear, very minute; leaves narrow-linear, ..... *C. neriifolia*.

× × Pods and calyx brown or dark brown tomentose or pubescent, leaves narrow.

Stems sulcate, but not angular; pods sessile, 1—1 $\frac{1}{4}$  in. long, ..... *C. juncea*.

Stems sharply 4-angular; pods shortly stalked, 1 $\frac{1}{2}$ —2 in. long, ..... *C. tetragona*.

+ + Stipules large, leafy, half-lunate. Flowers blue or rarely greenish white.

Stems angular, more or less puberulous to glabrous; leaves rhomboid; pods pubescent, .. *C. verrucosa*.

## B. FOLIOLATE. Leaves 3—7-foliolate.

\* Leaves digitately 5 (occasionally 3)—7-foliolate.

Leaves 5-foliolate; flowers rather large, yellow, racemose; bracts 3—4 lin. long, linear, acuminate, reflexed; pods glabrous, stalked, 1 $\frac{1}{4}$ —1 $\frac{1}{2}$  in. long, .... *C. quinquefolia*.

\* \* Leaves digitately 3-foliolate.

× Pods inflated.

+ Pods short, globular or obliquely ovoid, 1-2-4-seeded.

Stipules and bracts minute, subulate; flowers small, by 1—2 (rarely 3—4) terminating slender leaf-opposed peduncles; pods acuminate, minutely appressed pubescent, 1—2-seeded, ..... *C. medicaginea*.

+ + Pods oblong to linear-oblong, many-seeded.

Pods indistinctly appressed-pubescent, linear-oblong, 1—1 $\frac{1}{4}$  in. long, ..... *C. striata*.

Pods densely tawny-villous, boat-shaped-oblong, somewhat curved,  $\frac{3}{4}$ — $\frac{1}{2}$  in. long, .. *C. bracteata*.

× × Pods much compressed (*Priotropis*, WA.).



Habit of *C. striata*; flowers yellow, racemose; pods 1 in. long by  $\frac{1}{2}$  broad, acuminate at both ends, on a filiform stalk, glabrous, ..... *C. cytisoidea*.

1. *C. FILIFORMIS*, Wall. Cat. 5389; Hf. Ind. Fl. II. 66.

HAB. Frequent in the mixed forests, especially the upper ones, of the Pegu Yomah, and along choungs in the lower mixed forests of the plains; also Prome district.—Fl. Fr. Nov. to Jan.

2. *C. STOCKSII*, Bth. MS.; Hf. Ind. Fl. II. 67.

HAB. Tenasserim (or Andamans?) (Helf.).

Unknown to me and included on Baker's authority.

3. *C. PROSTRATA*, Roxb. Fl. Ind. III. 270; Mart. Muench. Denkschr. 6. t. E; Hf. Ind. Fl. II. 67.

HAB. Martaban, Nattoung hills, east of Tounghoo (Revd. F. Mason).

4. *C. ACICULARIS*, Ham. ap. Bth. in Hook. Lond. Journ. Bot. II. 476; Hf. Ind. Fl. II. 68.

HAB. Common, chiefly in the dry and open forests, preferring stiff diluvial soils, all over Chittagong and Prome to Pegu and Martaban.—Fl. Fr. C. and HS.

5. *C. FERRUGINEA*, Grah. in Wall. Cat. 5398; Hf. Ind. Fl. II. 68.

Var.  $\alpha$ . *GENUINA* (*C. ferruginea*, var.  $\beta$ . *pilosissima*, Bth. in Hf. Ind. Fl. II. 68), more or less spreading; leaves narrower and more or less acute; all parts more densely rusty pilose.

Var.  $\beta$ . *PILOSISSIMA* (*C. pilosissima*, Miq. Fl. Ind. Bat. I 327), erect and often less pilose; leaves broader and rounded or blunt at the apex.

HAB. Var.  $\alpha$ . frequent in the drier hill- and the pine-forests of Martaban and Ava, at 4000 to 5000 ft. elevation; var.  $\beta$ . frequent along rocky river-beds in the tropical forests, from Ava and Martaban down to Tenasserim.—Fl. Fr. HS.

6. *C. ALATA*, Roxb. Hort. Bengh. 98. and Fl. Ind. III. 274; Hf. Ind. Fl. II. 69. (*C. bialata*, Roxb. Fl. Ind. III. 274).

HAB. Common in the long-grassed jungle-pastures of the open and dry forests, but also in the mixed forests, etc., all over Burmah, from Chittagong and Ava down to Pegu and Martaban.—Fl. Fr. Close of RS., and CS.

7. *C. ALBIDA*, Heyne in Roth. Nov. sp. 333; Hf. Ind. Fl. II. 71. (*C. montana*, Roxb. Fl. Ind. III. 265).

HAB. Frequent in the open and dry forests, all over Burma, from Chittagong and Ava down to Tenasserim.—Fl. Fr. CS.

8. *C. LINIFOLIA*, L. f. Suppl. 322; Roxb. Fl. Ind. III. 266; Hf. Ind. Fl. II. 72. (*C. caespitosa*, Roxb. Fl. Ind. III. 269; *C. melanocarpa*, Bth. in Hook. Lond. Journ. II. 569).

HAB. Not unfrequent in the mixed forests, especially the upper ones, from Ava and Prome down to Pegu and Martaban; also found in





grass-lands and along grassy borders of the fields in the Pegu plains.—Fl. Fr. CS.

N. B. *C. patula*, Grah. (in Wall. Cat. 5371; Bth. in Hook. Lond. Journ. II. 568, from Ava), is reduced by Baker to a variety of *C. nana*, Burm. I am unacquainted with the species.

9. *C. CALYCINA*, Schrank. Pl. rar. Monac. t. 12; Hf. Ind. Fl. II. 72. (*C. stricta*, Roxb. Fl. Ind. III. 265, non Roth.).

HAB. Ava, Irrawaddi-valley near Tagoung (J. Anderson); Taongdong (Wall.).—Fl. Fr. Jan.

10. *C. DUBIA*, Grah. in Wall. Cat. 5404; Hf. Ind. Fl. II. 73.

HAB. Frequent in the upper mixed forests, but chiefly in poonzohs, of Chittagong, Pegu, and Martaban, up to 3000 feet elevation.—Fl. Fr. CS.

11. *C. CHINENSIS*, L. sp. pl. 1003, non Roxb.; Hf. Ind. Fl. II. 73. (*C. barbata*, Miq. Fl. Ind. Bat. I. 338, non Grah.).

HAB. Pegu and Tenasserim (*teste* Baker).

12. *C. SESSILIFLORA*, L. sp. pl. 1004; Hf. Ind. Fl. II. 73.

HAB. Common in jungle-pastures and in open places of the open and dry forests, all over Burma, from Chittagong and Ava down to Tenasserim. Fl. Fr. Close of R. and CS.

13. *C. KURZII*, Bak. in Journ. As. Soc. Beng. 1873. 229; Hf. Ind. Fl. II. 75.

Var.  $\alpha$ . *GENUINA*, Leaves longer and of a thinner texture; flowers usually axillary and gradually passing into terminal or axillary racemes with all intermediate conditions on the same plant; pods an inch long. Low-level form.

Var.  $\beta$ . *MONTANA*, leaves of a firmer texture and half the size; flowers in true leafless elongate axillary and terminal racemes; pods only  $\frac{1}{2}$  an inch long. High-level form.

HAB. Var.  $\alpha$ . common in the upper, rare in the lower mixed forests, all over the Pegu Yomah and Martaban; var.  $\beta$ . pretty frequent in the drier hill- (especially the pine-) forests of Martaban, up to 5000 feet elevation.—Fl. CS.; Fr. HS.

*C. Peguana*, Bth. MS. (Hf. Ind. Fl. II. 77, from Rangoon), is unknown to me. It seems to me to differ in no respect from the axillary-flowered form of the above.

14. *C. ASSAMICA*, Bth. in Hook. Lond. Journ. Bot. II. 481; Hf. Ind. Fl. II. 75.

HAB. Ava, in the Khakyen hills, east of Bhamo (J. Anderson).—Fl. Fr. March.

In Ava specimens the flowers sometimes grow indifferently in the place of the leaves from the leaf-branches, so that the flowers are either mixed up with the leaves (reduced flowering branchlets) or form incomplete ra-



comes below the leafy summit. The species itself, however, may be nothing but a more pubescent hill-form of *C. retusa*.

14. *C. MACROPHYLLA*, Kurz MS. (*C. Kurzii*, var. *luxurians*, Kurz in Journ. As. Soc. Beng. 1873, 229).

HAB. Rare in the moister upper mixed forests of the Southern Pegu Yomah.—Fr. CS.

I have referred this form erroneously to *C. Kurzii*, but the stout hollow stems bring it nearer to *C. Assamica*, from which it differs not only in its much larger petioled leaves and in the calyx, but also in the pods, which are sessile and 1½—2 in. long. Habitually it may be called a very luxuriant terminal-racemed form of *C. Kurzii*.

15. *C. RETUSA*, L. sp. pl. 1004; Roxb. Fl. Ind. III. 272; Bot. Mag. t. 2561; Bot. Reg. t. 253; Hf. Ind. Fl. II. 75.

HAB. Chiefly in grassy sandy places near the sea in Arracan and Pegu, but also found along the banks of the Irrawaddi in the Prome district; it has become a weed on Ross Island etc., on the Andamans, but there very likely only introduced.—Fl. Fr. Close of RS. and DS.

16. *C. SERICEA*, Retz. Obs. III. 26; Roxb. Fl. Ind. III. 273; Hf. Ind. Fl. II. 75.

HAB. Frequent along rocky choungs in the hills of Chittagong, Arracan, and the Pegu Yomah; rarely seen along the banks of the larger rivers in the plains of Pegu.—Fl. Fr. CS.

17. *C. NERIIFOLIA*, Wall. Cat. 5362; Hf. Ind. Fl. II. 74.

HAB. Not unfrequent in the hill-eng-forests of Martaban, east of Tounghoo; Ava, Taong-dong (Wall.).—Fl. Nov.; Fr. March, Apr.

18. *C. JUNCEA*, L. sp. pl. 1004; Bot. Mag. t. 490; Roxb. Corom. Pl. II. t. 193 and Fl. Ind. III. 259; Hf. Ind. Fl. II. 79. (*C. fenestrata*, Sims. Bot. Mag. t. 1933; *C. tenuifolia*, Roxb. Fl. Ind. III. 263).

HAB. Frequently cultivated in fields all over Burma, especially in Prome and Pegu, but also like wild along the banks of the larger rivers, especially the Irrawaddi.—Fl. Fr. H. and RS.

19. *C. TETRAGONA*, Roxb. Fl. Ind. III. 263; Andr. Bot. Repos. t. 593; Hf. Ind. Fl. II. 78. (*C. grandiflora*, Zoll. in Miq. Fl. Ind. Bat. I. 333, teste Baker).

HAB. Frequent, especially along rocky choungs in hilly tracts, all over Ava and Chittagong to Pegu and Arracan; ascending to 3000 feet elevation; less frequent along rivers in the alluvium of the plains.—Fl. Fr. CS.

20. *C. VERRUCOSA*, L. sp. pl. 1005; Roxb. Fl. Ind. III. 273; Bot. Mag. t. 3034; Bot. Reg. t. 1134; Wight Icon. t. 200; Hf. Ind. Fl. II. 77. (*C. angulosa*, Lamk. Enc. II. 196?; Roxb. Fl. Ind. III. 274; *C. coerulea*, Jacq. Icon. t. 144).



HAB. Frequent in open grassy places, along river-banks and roadsides, especially in Ava and Prome, less frequent in Pegu and Martaban.—Fl. Fr. C. and H. S.

21. *C. QUINQUEFOLIA*, L. sp. pl. 1006 ; Roxb. Fl. Ind. III. 279 ; Hf. Ind. Fl. II. 84 (*C. sp.* Griff. Not. Dicot. 437).

HAB. Not unfrequent in wet pastures, marshy grass-lands and along borders of rice-fields, from Arracan and Pegu down to Tenasserim.—Fl. Fr. RS.

22. *C. MEDICAGINEA*, Lamk. Dict. II. 201 ; Hf. Ind. Fl. II. 81 (*C. procumbens*, Roxb. Fl. Ind. 278).

HAB. Not unfrequent in the dry forests of Ava and Prome ; rare in the mixed forests of Pegu.—Fl. Close of RS ; Fr. CS.

23. *C. BRACTEATA*, Roxb. Fl. Ind. III. 278 ; Wight Icon. t. 273 ; Griff. Not. Dicot. 436 ; Hf. Ind. Fl. II. 83.

HAB. Not unfrequent in the mixed forests, especially the upper ones, and in dry pastures and rubbishy places adjoining them, all over Burma, from Chittagong and Ava down to Tenasserim.—Fl. Fr. Close of RS. and CS.

24. *C. STRIATA*, DC. Prod. II. 131 ; Bot. Mag. t. 3200 ; Hf. Ind. Fl. II. 85. (*C. Brownei* Rehb. Icon. Exot. t. 232 ; *C. Saltiana*, Andr. Bot. Repos. t. 648).

HAB. Frequent in grass and cleared lands, rubbishy places, along roadsides, etc., all over Pegu and Chittagong to Arracan ; most probably throughout the country.—Fl. Fr. R. and CS.

25. *C. CYTISOIDES*, Roxb. Fl. Ind. III. 276 (*Priotropis cytisoides*, WA. Prod. I. 180 in adn. ; Hf. Ind. Fl. II. 65).

HAB. Ava, Taong-dong, Khakhyen hills, east of Bhamo ; also Tenasserim (Griff.)—Fl. F. R. and CS.

#### *Parochetus*, Ham.

1. *P. COMMUNIS*, Ham. in Don. Prod. Fl. Nep. 240 ; Royle Ill. Him. Pl. t. 35 ; Hf. Ind. Fl. II. 86. (*P. major*, Don. Fl. Nep. 241 ; Wight Icon. t. 483 ; *P. maculatus*, R. Br. in Benn. Pl. Jav. rar. 162. t. 34 ; *Cosmiosa repens*, Alef. in Bot. Ztg. 1866. 145. t. 6. B. f. 1—6).

HAB. Ava and Tenasserim (*teste* Baker).

#### *Melilotus*, Juss.

1. *M. ALBA*, Desr. in Lamk. Dict. IV. 64 ; Koch Syn. Fl. Germ. ed. 3. I. 144 ; Hf. Ind. Fl. II. 89. (*M. leucantha*, Koch in DC. Fl. Franc. V. 564 ; Engl. Bot. Suppl. t. 2689 ; *Trifolium Indicum*, Willd. sp. pl. III. 1353 ; Roxb.—Fl. Ind. III. 388).

HAB. Prome district, a weed in the fields of the Irrawadi valley.—Fl. Fr. CS.



**Psoralea, L.**

1. *P. CORYLIFOLIA*, L. sp. pl. 1075 ; Roxb. Fl. Ind. III. 387 ; Bot. Mag. t. 665 ; Hf. Ind. Fl. II. 103. (*Melilotus* sp. Griff. Not. Dicot. 437. t. 578).

HAB. Occasionally in neglected fields, near hedges and along roadsides in the Prome district ; apparently more frequent in Ava.—Fl. Fr. CS.

**Cyamopsis, DC.**

\*1. *C. PSORALIOIDES*, DC. Prod. II. 216 ; Wight Icon. t. 248 ; Hf. Ind. Fl. II. 92. (*Dolichos fabaformis*, L' Her. Stirp. t. 78 ; Roxb. Fl. Ind. III. 316 ; *Lupinus trifolius*, Cav. Icon. t. 59).

HAB. Burma, cultivated (according to Revd. F. Mason).—Fl. Fr. CS.

**Indigofera, L.***Conspectus of Species.*

*Subg. 1. Sphaeridiophora*, Desv. Ovary 1-ovuled. Pods very short, 1-seeded.

All parts, also the pods, appressed silk-hairy ; leaves simple, small ; pods almost globular, ..... *I. linifolia*.

*Subg. 2. Eu-Indigofera*, Bth. Ovary 2—more-ovuled ; pods usually elongate, rarely short.

\* *Calyx deeply cleft, the lobes subulate-acuminate. Corolla about twice so long as the calyx. Annuals or perennials.*

+ Pods short, 2- rarely 3-seeded.

Appressed pubescent ; leaves pinnate ; pods almost 4-angular, shortly hairy ; seeds cubical, ..... *I. enneaphylla*.

+ + Pods many- or several-seeded, elongate.

O Seeds cylindrical.

Leaflets usually in 4 to 5 pairs ; racemes shorter than the leaves, ..... *I. tinctoria*.

Leaflets in 1 or 2 pairs ; racemes very slender, much longer than the leaves, ..... *I. endecaphylla*.

Leaves 3-foliolate ; racemes very short or reduced to clusters, ..... *I. trifoliata*.

O O Seeds cubical or 4-angular-oblong.

All parts (also the pods) viscid-pubescent ; leaflets in 4—7 pairs, ..... *I. viscosa*.

All parts appressed greyish or silvery pubescent ; leaves 3-foliolate ; pods thinly appressed pubescent, ..... *I. trita*.

All parts hirsute-pubescent ; leaflets usually in 3 or 4 pairs ; pods hirsute, ..... *I. hirsuta*.

\* \* *Calyx toothed, the teeth short, more or less acute. Corolla at least 3 times as long as the calyx and usually much longer. More or less woody shrubs.*

x Leaves simple or 3-foliolate (often on the same plant).

Whole plant greyish from minute appressed stiff hairs ; leaves 1—3-foliolate on the same plant ; stipules very minute, ..... *I. Brunoniana*.

Softly tawny pubescent ; leaves 1-foliolate ; stipules about 2 lin. long, ..... *I. caloneura*.

x x Leaves unpaired pinnate.

O Pods  $1\frac{1}{2}$ —2 in. long, more or less 4-gonous ; seeds cubical or 4-cornered.





Stipules 2—3 lin. long ; pods minutely appressed pubescent, ..... *I. galegoides*.  
 Stipules minute ; pods glabrous, ..... *I. pulchella*.  
 O O Pods about an inch long, terete. Seeds cylindrical.

Pods glabrous ; stipules minute, ..... *I. elliptica*.

1. *I. LINIFOLIA*, Retz. Obs. IV. 29. and VI. 33. t. 2 ; Roxb. Corom. Pl. II. t. 196 and Fl. Ind. III. 370 ; Wight Icon. t. 313 ; Hf. Ind. Fl. II. 92.

HAB. Not unfrequent in short-grassed rather dry pastures of Chit-tagong, Pegu, and Arracan ; probably all over the country.—Fl. Fr. chiefly C. and HS.

2. *I. ENNEAPHYLLA*, L. Mant. 272 ; Roxb. Fl. Ind. III. 376 ; Wight Icon. t. 403 ; Hf. Ind. Fl. II. 94.

HAB. Ava, on limestone hills about Segain ; in the dry forests of the Prome district.—Fl. Fr. Nov.

3. *I. TINCTORIA*, L. sp. pl. 1061 ; Roxb. Fl. Ind. III. 379 ; Wight Icon. t. 365 ; Royle Ill. Him. Pl. t. 195 ; Hf. Ind. Fl. II. 99.

Var. *a. GENUINA*, pods about an inch long and more slender, usually straight or only slightly curved, 7—10-seeded, the seeds about a line long, pale coloured.

Var. *β. ANIL* (*J. Anil*, L. Mant. 272 ; Miq. Fl. Ind. Bat. I. 307 ; *J. coerulea*, Roxb. Fl. Ind. III. 377 ; Wight Icon. t. 366 ; *I. argentea*, var. *coerulea*, Bak. in Hf. Ind. Fl. II. 99), pods more curved and reflexed, shorter, about  $\frac{1}{2}$  in. long but sometimes longer, 3—4, but as often 4—6 and even up to 7-seeded, the seeds smaller, olive-coloured.

HAB. Var. *a.* frequently cultivated in the Irrawaddi alluvium of Prome and Pegu, and most probably elsewhere ; var. *β.* frequent in the open forests, especially the low ones, in jungle-pastures and along river-banks, all over Burma, from Ava and Martaban down to Tenasserim.—Fl. Fr. Close of RS., and CS.

I cannot find any sufficient grounds for specifically separating the above two forms ; the pod differs greatly on the same plant.

4. *I. ENDECAPHYLLA*, Jacq. Icon. t. 570 ; Bot. Reg. t. 789 ; Hf. Ind. Fl. II. 98. (*I. debilis*, Grah. in Wall. Cat. 5466 ; Kurz in Journ. As. Soc. Beng. 1874, 184).

HAB. Ava, Irrawaddi valley (Wall. ; Mrs. Burney).—Fl. Sept.

The pods of the Burmese plant are more slender and more persistently pubescent.

5. *I. TRIFOLIATA*, L. Amoen. IV. 327 ; Wight Icon. t. 314 ; Hf. Ind. Fl. II. 96.

HAB. Tenasserim (Helf.) *teste* Baker.

6. *I. VISCOSA*, Lamk. Encycl. Meth. III. 247 ; Roxb. Fl. Ind. III. 377 ; Wight Icon. t. 404 ; Hf. Ind. Fl. II. 95.

HAB. Ava, near Mandalay (J. Anderson).—Fl. Fr. Sept.





7. *I. TRITA*, L. f. Suppl. 335; Roxb. Fl. Ind. III. 371; Wight. Icon. t. 315 and t. 386; Hook. Comp. Bot. Mag. I t. 16; Hf. Ind. Fl. II. 96. (*I. cinerea*, Willd. sp. pl. III. 1225; Roxb. l. c. 372).

HAB. Ava, Taong dong (Wall.).—Fr. Octob.

8. *I. HIRSUTA*, L. sp. pl. 1862; Roxb. Fl. Ind. III. 376; Jacq. Icon. t. 569; P. d. B. Fl. d' Ovar. t. 119; Hook. Comp. Bot. Mag. t. 24; Hf. Ind. Fl. II. 98.

HAB. Ava (Wall.); Tenasserim (*teste* Baker).—Fl. Octob.

9. *I. BRUNONIANA*, Grah. in Wall. Cat. 5491; Wall. Pl. As. rar. III. 48. t. 279; Hf. Ind. Fl. II. 93.

HAB. Not unfrequent in the eng-forests of the Prome district and of Pegu.—Fl. Close of RS.; Fr. CS.

10. *I. CALONEURA*, Kurz in Journ. As. Soc. Beng. 1873, 219; Hf. Ind. Fl. II. 93.

HAB. Pegu (Brandis), probably a laterite plant.

11. *I. GALEGOIDES*, DC. Prod. II. 225; Miq. Fl. Ind. Bat. I. 310; Hf. Ind. Fl. II. 100. (*I. uncinata*, Roxb. Fl. Ind. III. 382; *I. Zollingeriana*, Miq. Fl. Ind. I. 310? *teste* Baker).

HAB. Not unfrequent in the open, and more especially in the hill-eng-forests, of Martaban down to Tenasserim, up to 4000 feet elevation; also Pegu, Rangoon (Wall.).—Fl. RS.; Fr. CS.

12. *I. PULCHELLA*, Roxb. Fl. Ind. III. 382; Wight Icon. t. 367; Bedd. Fl. Sylv. 85. Anal. t. 12. f. 1.; Hf. Ind. Fl. II. 101, in part only. (*I. purpurascens*, Roxb. Fl. Ind. III. 383? *I. arborea*, Roxb. l. c. 318; Wight Icon. t. 368.)

HAB. Not unfrequent in the dry and open (chiefly the eng-) forests from Ava and Prome down to Pegu and Martaban.—Fl. Fr. C. and HS.

N. B. *I. VIOLACEA*, Roxb. l. c. 380, differs from the above in the pod and the cylindrically oblong pale-coloured seeds. It is in my eyes nearer akin to *I. elliptica*, from which it deviates only in the size and colour of the seeds.

13. *I. ELLIPTICA*, Roxb. Fl. Ind. III. 380.

HAB. Pegu, Rangoon (Cleghorn); Karen country (O'Riley); Tenasserim, Salween (Wall.).—Fr. CS.

### **Sesbania, Pers.**

#### *Conspectus of Species.*

*Subg. 1. Agati*, Desv. Flowers 2—3 in. long, falcately recurved in bud, the standard acute or bluntish.

Small glabrous tree; flowers showy, white or scarlet, ..... *S. grandiflora*.

*Subg. 2. Eu-Sesbania*, Bth. Flowers less than an inch long, straight in bud, yellow or brown-purple, the standard broad, more or less notched.

\* *Racemes drooping from the base. Small trees.*





Glabrous; pods  $1\frac{1}{2}$ —2 lin. broad, somewhat angular from the prominent sutures,

... *S. Ægyptiaca*.

\* \* *Racemes erect from the base, but often overhanging. Shrubby annuals.*

Pods rather convex on both sides,  $1\frac{1}{2}$ —2 lin. broad; standard  $\frac{1}{2}$  in. long; seeds cylindrical, ..... *S. aculeata*.

Pods rather flat, 2—3 lin. broad, narrowly bordered; standard  $\frac{3}{4}$  in. long, seeds more or less compressed-rhomboid, ..... *S. Cochinchinensis*.

\*1. *S. GRANDIFLORA*, Pers. Syn. II. 316; Bth. Fl. Austr. II. 212; Hf. Ind. Fl. II. 115. (*Agati grandiflora*, Desv. in Journ. Bot. III. 120; Griff. Not. Dicot. 438; *Æschynomene grandiflora*, Roxb. Fl. Ind. III. 331).

HAB. Only planted, but generally found in villages all over Burma.—Fl. RS.

\*2. *S. ÆGYPTIACA*, Pers. Ench. II. 316; Wight Icon. t. 42; Bedd. Fl. Sylv. 86. Anal. t. 12. f. 3; Hf. Ind. Fl. II. 114. (*Æschynomene sesban*, L. sp. pl. 1061; Roxb. Fl. Ind. III. 332; *S. picta*, Pers., Bot. Mag. t. 873).

HAB. Generally planted in villages all over Burma.—Fl. Fr. Jan.—May.

3. *S. ACULEATA*, Pers. Enchir. II. 316; Hf. Ind. Fl. 115. (*Æschynomene spinulosa*, Roxb. Fl. Ind. III. 333; *S. polyphylla*, Miq. in Fl. Ind. Bat. I. 288; *Æschynomene cannabina*, Roxb. Fl. Ind. III. 335, non Pers.)

HAB. Rather frequent in long-grassed pastures and savannahs of the Kolodyne valley, Arracan.—Fl. Octob.

4. *S. COCHINCHINENSIS*, DC. Prod. II. 266; Miq. Fl. Ind. Bat. I. 287? (*Æschynomene paludosa*, Roxb. Fl. Ind. III. 333; *Sesbania cannabina*, Pers. Enchir. II. 316; WA. Prod. I. 215; *S. aculeata*, var. *cannabina*, Bak. in Hf. Ind. Fl. II. 115).

HAB. Not unfrequent in swamps and swampy pastures all over the plains of Pegu; also Chittagong.—Fl. Octob.; Fr. CS.

The Pegu plant is much smaller, and has the broad flat pod of this species and the habit and seeds of *S. aculeata*, but much fewer leaflets.

### **Tephrosia, Pers.**

#### *Conspectus of Species.*

\* *Flowers in axillary or leaf-opposed racemes, rarely reduced to 2 or a few only. Leaves unpaired-pinnate, rarely simple.*

× Calyx-teeth short, deltoid. (*Brissonia*, Neck.)

Shrub, silky pubescent; corolla  $\frac{3}{4}$ —1 in. long, white; racemes terminal and lateral; pod appressed silk-hairy, ..... *T. candida*.

× × Calyx-teeth narrow, cuspidate, as long as the calyx-tube. Annuals or undershrubs. (*Reinertia*, Moench.)

+ Flowers in racemes.





O Racemes peduncled, leaf-opposed (and terminal).

Almost glabrous or very thinly appressed silk-hairy ; pods glabrous or nearly so,

... *T. purpurea*.

O O Racemes axillary (and terminal), sometimes reduced.

Apparently similar to the preceding, but racemes short or reduced to a few (2) flowers only, ..... *T. pauciflora*.

Racemes long-peduncled, many-flowered ; leaves pinnate, leaflets in 3—6 pairs, appressed silvery silk-hairy ; pods glabrescent, ..... *T. tinctoria*

Racemes long-peduncled, many-flowered ; leaves pinnate, leaflets in 6—9 pairs, thinly appressed silk-hairy ; pods densely brownish silk-hairy, ..... *T. Hookeriana*.

Racemes long-peduncled, few-flowered at the apex ; leaves simple, or with a pair of diminutive basal leaflets ; rest as in *T. tinctoria*, ..... *T. Grahamii*.

+ + Flowers solitary or by pairs in the leaf-axils.

Silvery silk-hairy ; leaflets in 2—3 pairs ; pods appressed silvery pubescent,

... *T. senticosa*.

\* \* Flowers solitary or paired in the leaf-axils, very small. Leaves simple. (*Macronyx*, Dalz.).

All parts thinly silk-hairy ; leaves linear ; peduncle capillary, ..... *T. tenuis*.

1. *T. CANDIDA*, DC. Prod. II. 249 ; Hf. Ind. Fl. II. 111. (*Kiesera sericea*, Rwdt. in Miq. Fl. Ind. Bat. I. 291).

HAB. Chittagong, Martaban and Tenasserim (*teste* Baker).

2. *T. PURPUREA*, Pers. Ench. II. 329 ; Hf. Ind. Fl. II. 112, in part. (*Galega purpurea*, L. sp. pl. 1063 ; Roxb. Fl. Ind. III. 386 ; *Galega lanceifolia*, Roxb. l. c.).

HAB. Common in grassy lands, in shrubbery, along river- and roadsides, etc., also in savannahs, all over Burma, from Chittagong and Ava down to Tenasserim.—F. RS., Fr. CS.

2. *T. PAUCIFLORA*, Grah. in Wall. Cat. 5635 ; Hf. Ind. Fl. II. 114,

HAB. Ava, Paghmyo (Wall.)—Unknown to me.

3. *T. TINCTORIA*, Pers. Enchir. II, 329 ; Wight Icon. t. 388 ; Hf. Ind. Fl. II. 111. (*Galega tinctoria*, L. sp. pl. 1063 ; Roxb. Fl. Ind. III. 386 ; *Galega Heyneana*, Roxb. l. c. 384).

Var.  $\alpha$ . *GENUINA*, the indument more or less tawny ; leaflets oblong to elliptically oblong.

Var.  $\beta$ . *COCCINEA*, Bak. in Hf. Ind. Fl. II. 112. (*T. coccinea*, Wall. Pl. As. rar. t. 60), the indument silvery white ; leaflets short and more or less obovate, the base usually cuneate.

HAB. VAR.  $\beta$ . only, Ava, along the banks of the Irawaddi, apparently common.—Fl. Fr. RS.

4. *T. GRAHAMII*, Wall. Cat. 5652 (*T. tinctoria*, var. *Grahamii*, WA. Prod. I. 211).

HAB. Rather frequent in the eng-forests of the Prome District.—Fl. RS. ; Fr. CS.

5. *T. SENTICOSA*, Pers. Syr. II. 330 ; Wight Icon. t. 370 ; Hf. Ind.





Fl. II. 112. (*Galega senticosa*, L. Amoen III. 19 ; *Galega pentaphylla*, Roxb. Fl. Ind. III. 384).

HAB. Ava, Yenang-choung (Wall.) *teste* Baker.

6. T. TENUIS, Wall. Cat. 5970 ; Hook. in Journ. Bot. II. 35 in adn. ; Hf. Ind. Fl. II. 111.

HAB. Ava, Segain, limestone-hills (Wall.).—Fr. Nov.

### Millettia, WA.

#### Conspectus of Species.

*Subg. 1. Notho-Millettia*, Miq. Stamens diadelphous (9 + 1 and 7 + 1). Seeds usually not compressed.—Trees.

Glabrous ; corolla purple, glabrous ; stamens 9 + 1 ; pods coriaceous, the valves very convex and smooth, ..... *M. atropurpurea*.

*Subg. 2. Eu-Millettia*, Bak. Stamens monadelphous, the 10th vexillary stamen more or less free at the base only. Seeds much compressed.

\* *Standard not auricled at the base.*

× Trees.

× Valves of pod without prominent ledges or wings on the margins, flat or slightly convex, glabrous or nearly so.

O Pod-valves not rough from warts or lentils.

Young parts and leaves beneath slightly pubescent ; corolla glabrous, lilac ; pods appressed puberulous, ..... *M. pulchra*.

Young parts slightly pubescent ; corolla pubescent, lilac ; pods glabrous, *M. Brandisiana*,  
Leaves beneath sparingly appressed grey-hairy ; corolla glabrous ; pod obscurely "grey-canescens," ..... *M. cana*.

O O Pod-valves rough from warts or lentils, glabrous.

Young shoots silky pubescent ; corolla glabrous, white ; pods thick, lenticellate-rough, ..... *M. leucantha*.

Glabrous ; corolla glabrous, blue ; pod thick, warted, ..... *M. ovalifolia*.

× × Valves of pod extended into prominent ledges or wings.

Young shoots slightly pubescent ; leaflets bluntish acuminate ; racemes almost glabrous ; corolla steel-blue, glabrous ; pods sharply edged, ..... *M. glaucescens*.

As preceding, but racemes pubescent ; corolla white, glabrous ; pods unknown, ..... *M. pubinervis*.

Shortly tomentose, especially while young ; leaflets rounded at the apex ; corolla pale blue, glabrous ; pods with 4 waved marginal wings, ..... *M. tetraptera*.

+ + Woody climbers.

× Corolla glabrous. Ovary more or less pubescent. Pod glabrous.

Young shoots and leaves beneath pubescent ; calyx broader than deep ; corolla white ; pods fleshy coriaceous, torose, ..... *M. pachycarpa*.

As preceding, but glabrescent ; flowers much smaller, lilac ; calyx longer than wide ; pod unknown, ..... *M. monticola*.

× × Corolla, at least the standard, velvety or silky pubescent outside.

Leaves glabrous ; flowers racemose, in terminal panicles ; pods torose, tawny velvety, ..... *M. cinerea*.

Leaves appressed silvery or coppery silk-hairy beneath ; flowers in lateral racemes ; pods flat, not torose, brown-velvety, ..... *M. sericea*.





Leaves glabrous ; flowers in axillary short peduncled racemes ; pods brown velvety,  
*...M. coerulca.*

• • Standard auricled at the base on both sides of the claw.

× Corolla glabrous.

Young shoots rusty tomentose ; corolla violet ; ovary quite glabrous, ..... *M. leiogyna.*

× × Corolla, at least the standard, velvety or silky pubescent outside.

O Leaflets blunt or apiculate, rarely shortly acuminate. Branches brown.

Flowers purple ; racemes elongate, longer than the petiole ; pods glabrous when fully ripe, ..... *M. extensa.*

Flowers white ; racemes elongate, much longer than the petiole ; pods tawny or brown tomentose even when fully ripe, ..... *M. macrophylla.*

Flowers rose-coloured ; racemes much shorter than the petiole ; leaflets obtuse ; pods tawny or brown tomentose, ..... *M. fruticosa.*

O O Leaflets glaucous beneath, long- and caudate-acuminate. Branches grey.

Low scandent shrub, almost glabrous ; flowers, ..... *M. caudata.*

1. *M. ATROPURPUREA*, Bth. in Pl. Jungh. I. 249 in adn. ; Hf. Ind. Fl. II. 108. (*Pongamia atropurpurea*, Wall. Pl. As. rar. I. 70. t. 78 ; *Pongamiae* sp. Griff. Not. Dicot. 444).

HAB. Rather frequent in the tropical forests along the eastern and southern slopes of the Pegu Yomah and from Martaban down to Tenasserim.—Fl. Jan.—March ; Fr. May, June.

*M. paniculata*, Miq. Fl. Suppl. Fl. Sumatr. 301, differs only in its larger and more flattened pods ; the seeds in my specimens are not developed. Miquel ascribes to this species a very abnormal diadelphism, viz. 7 + 1. *M. sp.* No. 1. from Malacca in Hf. Ind. Fl. II. 110 is apparently the same. *Pongamia glandulosa*, Griff. Not. Dicot. 443, from Mergui, remains doubtful to me, the more so as Griffith says nothing of the stamens, while he describes 10 hypogynous glands (abortive stamens?) surrounding the ovary ; he compares the tree to *M. atropurpurea*.

2. *M. PULCHRA*, Kurz in Journ. As. Soc. Beng. 1873. 69. sub 138 and Pegu Report A. 45 ; Hf. Ind. Fl. II. 104. (*Mundulea pulchra*, Bth. in Pl. Jungh. I. 248 in adn.).

HAB. Ava Hills (Griffith).

3. *M. BRANDISIANA*, Kurz in Journ. As. Soc. Beng. 1873, 69 ; Hf. Ind. Fl. II. 108.

HAB. Frequent in the upper mixed forests of the Pegu Yomah.—Fl. March—Apr. ; Fr. Jan. Febr.

Closely allied to the preceding species.

4. *M. CANA*, Bth. in Hf. Ind. Fl. II. 105. (*Pongamia cana*, Grah. in Wall. Cat. 5903 ; Bth. in Pl. Jungh. 250 in adn.).

HAB. Ava, banks of the Irrawaddi at Yenang choung (Wall.).

I do not know what authority Baker has for calling this species a climber.





5. *M. LEUCANTHA*, Kurz in Journ. As. Soc. Beng. 1873, 68. (*M. pendula*, Bak. in Hf. Ind. Fl. II. 105; *Pongamia pendula*, Grah. in Wall. Cat. 5902; Bth. in Pl. Jungh. 250 in adn., nomen enigmaticum).

HAB. Frequent in the dry and open forests, less so in the upper mixed forests, all over Prome and the Pegu Yomah, up to 2000 ft. elevation.—Fl. March, Apr; Fr. Apr., May.

6. *M. OVALIFOLIA*, Kurz in Journ. As. Soc. Beng. 1873, 68, excl. syn. *teste* Baker; Hf. Ind. Fl. II. 107.

HAB. Not unfrequent in the dry forests of the Prome district, where it occasionally enters the savannah forests.—Fl. Fr. March, Apr.

7. *M. GLAUDESCENS*, Kurz in Journ. As. Soc. Beng. 1873, 67; Hf. Ind. Fl. II. 107.

HAB. Frequent in the tropical and moister upper mixed forests of the eastern slopes of the Pegu Yomah and of Martaban.—Fl. Apr., May; Fr. May, June.

8. *M. PUBINERVIS*, Kurz in Journ. As. Soc. Beng. 1873, 68; Hf. Ind. Fl. II. 106.

HAB. Martaban, rather rare in the upper mixed forests of Toukyeghat, east of Tounghoo.—Fl. Apr.

Very nearly allied to the preceding species, chiefly differing in its smaller and longer acuminate leaflets, and in the colour of the flowers and pubescence. The pods are still unknown.

9. *M. TETRAPTERA*, Kurz in Journ. As. Soc. Beng. 1873, 69; Hf. Ind. Fl. II. 106.

HAB. Not unfrequent in the dry forests of Prome and Ava.—Fl. Apr.

10. *M. PACHYCARPA*, Bth. in Pl. Jungh. I. 250; Hf. Ind. Fl. II. 106.

HAB. Ava, Khakyen Hills (J. Anderson).—Fl. Apr.

11. *M. MONTICOLA*, Kurz in Journ. As. Soc. Beng. 1873, 67; Hf. Ind. Fl. II. 106.

HAB. Martaban, in the stunted hill- and the pine-forests of the Nattoung hills, at 6500—7100 ft. elevation.—Fl. March.

N. B. Occurs also at Darjeeling, Sikkim, at 7000 ft. elevation (S. Gamble).

12. *M. CINEREA*, Bth. in Pl. Jungh. I. 249 in adn.; Hf. Ind. Fl. II. 106. (*Robinia paniculata*, Roxb. MS. Icon. XX. t. 151, No. 2543; *Pongamia heterocarpa*, Wall. ap. Voigt. Cat. Hort. Calc. 240).

HAB. Ava (Wall.); Chittagong.—Fl. May.

13. *M. SERICEA*, WA. Prod. I. 263 in adn.; Hf. Ind. Fl. II. 104. (*Pongamia sericea*, Vent. Malm. No. 28; DC. Prod. II. 416; *Dalbergia angustifolia*, Hassk. Pl. Jav. rar. 399, *teste* Baker).



HAB. Along choungs in the tropical forests of Martaban, east of Tounghoo.—Fl. May.

14. *M. CÆRULEA*, Bak. in Hf. Ind. Fl. II. 107.

HAB. Upper Tenasserim, at Phanoë (Wall.).—Unknown to me.

15. *M. LEIOGYNA*, Kurz in Journ. As. Soc. Beng. 1873, 67; Hf. Ind. Fl. II. 109.

HAB. Martaban, in an upper mixed forest at Nakawa choung, Toukyeghat east of Tounghoo.—Fl. Apr.

16. *M. EXTENSA*, Bth. in Hf. Ind. Fl. II. 109. (*Otosema extensa*, Bth. in Pl. Jungh. I. 249; Walp. Ann. IV. 580).

HAB. Frequent in the leaf-shedding forests up to 2000—3000 feet elevation, all over Burma, from Ava and Martaban down to Upper Tenasserim.—Fl. March, Apr.; Fr. CS.

A species not clearly distinct from *M. macrophylla* (*Otosema macrophylla*, Bth. in Pl. Jungh. I. 249; *Robinia macrophylla*, Roxb. Fl. Ind. III. 329; *M. auriculata*, Baker in Hf. Ind. Fl. II. 108), and probably only an Indo-Chinese form of it.

17. *M. FRUTICOSA*, Bth. in Hf. Ind. Fl. II. 109. (*Otosema fruticosa*, Bth. in Pl. Jungh. I. 249; *Robinia fruticosa*, Roxb. Fl. Ind. III. 328).

HAB. Pegu (*teste* Baker).

18. *M. CAUDATA*, Bak. in Hf. Ind. Fl. II. 109. (*Otosema caudata*, Bth. in Pl. Jungh. I. 249; *Tephrosia urophylla*, Wall. ap. Voigt. Hort. Calc. 216).

HAB. Martaban, creeping and twining in the rocky bed of the Toukyeghat river, east of Tounghoo.

I have leaf-specimens only. These have the leaflets broader than in the normal form, but in other respects they perfectly agree with the Assam plant.

#### *Pongamia*, Vent.

1. *P. MITIS*, (*Robinia mitis*, L. sp. pl. 1044; *P. glabra*, Vent. Hort. Malmais. I. t. 28; Wight Icon. t. 59; Bedd. Fl. Sylv. Madr. t. 177; Hf. Ind. Fl. II, 240; *Galedupa Indica*, Lamk. Encycl. Méth. II. 594; Roxb. Fl. Ind. III. 239).

HAB. Frequent in the tidal and beach-forests all along the coasts, from Chittagong down to Tenasserim and the Andamans.—Fl. Febr. March; Fr. RS.

#### *Derris*, Lour.

##### *Conspectus of Species.*

*Subg. 1. Brachypterum*, WA. (*Eu-Derris*, Bth.). Standard equally tapering at the base, with or without 2 basal callosities. Stamens monadelphous. Pods narrowly winged along the vexillary suture only.





• *Standard without basal callosities.*

× Flowers in simple or almost simple racemes.

+ Pods lanceolate, acuminate or acute at both ends.

Erect tree ; leaflets almost acute, mucronate, ..... *D. robusta*.

Scandent shrub ; leaflets notched, ..... *D. scandens*.

+ + Pods oblong or orbicular, with rounded ends. Scandent shrubs.

All parts, also the pods, glabrous, ..... *D. uliginosa*.

Rusty pubescent ; pods pubescent, ..... *D. elegans*.

× × Flowers racemose, collected into panicles.

Scandent, glabrous ; pods sinuately constricted between the seeds ; corolla  $\frac{1}{2}$  in long,

... *D. sinuata*.

• • *Standard with 2 basal callosities (Paraderria, Miq.)*

Scandent, young shoots densely silk-hairy ; flowers 10 lin. long ; ovary villous, *D. elliptica*.

*Subg. 2. Aganope, Miq. (Dipteroderria, Bth.)* Standard equally narrowed at the base and without callosities. Stamens monadelphous, or the vexillary one free. Pods more or less distinctly winged at both sutures.

Scandent, glabrous ; lateral nerves beneath very faint, immersed, ..... *D. amoena*.

1. *D. ROBUSTA*, Bth. in Linn. Proc. IV. Suppl. 104. (*Dalbergia robusta*, Roxb. Hort. Beng. 53 ; DC. Prod. II. 417 ; Wight Icon. t. 244 ; *Dalbergia Krowee*, Roxb. Fl. Ind. III. 229).

HAB. Not unfrequent in the upper and lower mixed forests of Pegu ; Ava ; also Andamans.—Fl. Apr.

2. *D. SCANDENS*, Bth. in Linn. Proc. IV. Suppl. 103 ; Hf. Ind. Fl. II. 240. (*Dalbergia scandens*, Roxb. Corom. Pl. II. t. 192 and Fl. Ind. III. 232 ; *Brachypterum scandens*, WA. in Wight Icon. t. 275).

HAB. Frequent in the tidal and swamp-forests, but also entering the savannah-forests, of the alluvial lands, all over Burma, from Chittagong, Prome, and Martaban down to Tenasserim and the Andamans.—Fl. Jun. Jul. ; Fr. CS.

3. *D. ULIGINOSA*, Bth. in Pl. Jungh. I. 252. and in Linn. Proc. IV. Suppl. 107. (*Pongamia uliginosa*, DC. Prod. II. 416 ; Hook Bot. Misc. III. 301. suppl. t. 41 sub *P. religiosa* and *P. triphylla* ; *Galedupa uliginosa*, Roxb. Fl. Ind. III. 243).

HAB. Frequent in the tidal forests and in low littoral lands, from Arracan down to Tenasserim and the Andamans.—Fl. March, May ; Fr. RS.

4. *D. ELEGANS*, Bth. in Pl. Jungh. I. 252 in adn. and in Linn. Proc. IV. Suppl. 109.

HAB. In the swamp-forests of the Irrawadi in Pegu, and along marshy streams in Tenasserim as far south as Mergui.—Fl. Febr. March.

5. *D. SINUATA*, Thw. Ceyl. Pl. 93 ; Bth. in Linn. Proc. IV. Suppl. 113. (*D. polyarthra*, Miq. Suppl. Fl. Sumatr. 298).

HAB. Not unfrequent in the tidal forests and in the beach-jungles of Pegu and Tenasserim.—Fr. Nov. Decb.



6. *D. ELLIPTICA*, Bth. in Linn. Proc. IV. Suppl. III (*Pongamia elliptica*, Wall. Pl. As. rar. III. 20. t. 237; Wight Icon. t. 420; *Galedupa elliptica*, Roxb. Fl. Ind. III. 242; *Pongamia volubilis*, Zoll. and Mor. Syst. Verz. 3; *Pongamia Horsfieldii*, Miq. Fl. Ind. Bat. I. 149).

HAB. Upper Tenasserim, Attaran and Moulmein (Wall.).

7. *D. AMOENA*, Bth. in Pl. Jungh. I. 252 in adn. and in Linn. Proc. IV. Suppl. 110.

HAB. Tenasserim, Moulmein to Mergui.—Fr. March.

### *Pterocarpus*, L.

#### *Conspectus of Species.*

Pods about an inch across, almost glabrous (even while young), the stylose point far above the base; calyx more glabrous, ..... *P. Indicus*.

Pods almost 1½—2 in. in diameter, when young densely velvety-pubescent, the stylose point at the basal corner; calyx rusty pubescent, ..... *P. macrocarpus*.

1. *P. INDICUS*, Willd. sp. pl. III. 904; Roxb. Fl. Ind. III. 238; Bedd. Fl. Sylv. t. 23; Hf. Ind. Fl. II. 238. (*P. flavus*, Lour. Fl. Cochinch. II. 525; Miq. Fl. Ind. Bat. I. 136; *P. dalbergioides*, Roxb. Fl. Ind. III. 236; Wight Icon. t. 246).

HAB. Frequent in the tropical and the moister upper mixed forests, from Martaban down to Tenasserim and the Andamans; rare along the eastern slopes of the Pegu Yomah.—Fl. May, Jun.; Fr. Jul., Aug.

2. *P. MACROCARPUS*, Kurz in Journ. As. Soc. Beng. 1874, 187; Hf. Ind. Fl. II. 239.

HAB. Frequent in the eng- and the upper mixed forests, from Martaban down to Tenasserim; very rare in the dry forests of the Prome District.—Fl. Apr. May; Fr. RS.

There are, as the Rev. Dr. Mason remarks (Journ. As. Soc. Beng. 1848, 223 sqq.), two kinds of padouk in Burma, the "padouk nee" (red padouk) and the "padouk pyoo" (white padouk). I do not know whether these two varieties correspond to the two species here adopted.

### *Dalbergia*, L.f.

#### *Conspectus of Species.*

Subg. 1. *Dalbergaria*, Bth. Stamens united into 2 separate sheaths of 5 each.

\* *Erect trees*,

× Pods velvety.

Leaves bluntish acuminate; panicles lax, puberulous; flowers purple, ..... *D. cana*.

× × Pods quite glabrous.

+ Leaflets rather large, apiculate, acute or acuminate.

Leaflets retuse-apiculate; panicles lax, puberulous; flowers white or purplish,

... *D. purpurea*.

Leaflets acute or shortly acuminate; panicles short and compact; calyx glabrous; flowers white, ..... *D. glomeriflora*.

+ + Leaflets blunt or retuse, rather small.



Panicle rather compact ; pedicels short or very short ; leaves nigrescent, *D. nigrescens*.  
 Panicle lax ; pedicels slender ; flowers white or purplish outside ; leaves not nigrescent, ..... *D. paniculata*.

\* \* *Woody climbers. (Leaflets blunt or retuse).*

Leaflets 11—13 ; panicles densely pubescent ; bractlets minute, ..... *D. volubilis*.

Leaflets 17—21 ; panicles glabrous ; bractlets small but conspicuous, ..... *D. stipulacea*.

*Subg. 2. Sissoa, Bth. Stamens united into a single slit sheath.*

\* *Erect trees. Flowers white.*

× Bractlets fallen long before expansion of the flowers.

Leaflets 3—7, almost orbicular to obovate, notched or blunt ; all parts glabrous,

... *D. latifolia*.

Young shoots appressed silky puberulous ; leaflets 7—11, more or less oblong, notched, or blunt, ..... *D. cultrata*.

× × Bractlets black, short and broad, deciduous but still present at flowering time.

Leaflets blunt, more or less notched and mucronate, ..... *D. glauca*.

Leaflets acuminate, smaller or more coriaceous, ..... *D. ovata*.

\* \* *Woody climbers.*

× Leaflets in 5—7 pairs ; inflorescence, etc., glabrous.

Flowers blue ; panicle ample, terminal ; leaflets more or less oblong, ..... *D. foliacea*.

Flowers white ; panicles small, axillary ; leaflets more or less obovate, ..... *D. rubiginosa*.

× × Leaflets in 11—41 pairs ; inflorescence and young branchlets rusty pubescent.

Leaflets  $\frac{1}{2}$ — $\frac{1}{2}$  in. long ; panicles or cymes very short, .. ..... *D. tamarindifolia*.

Leaflets 1—2 in. long ; panicle ample, ..... *D. velutina*.

1. *D. CANA*, Grah. in Wall. Cat. 5859 ; Kurz in Journ. As. Soc. Beng. 1873. 70 ; Hf. Ind. Fl. II. 237.

HAB. Not unfrequent in the tropical forests, especially along choungs, all along the eastern slopes of the Pegu Yomah, and from Martaban down to Upper Tenasserim.—Fl. March ; Fr. CS.

2. *D. PURPUREA*, Wall. Cat. 5869 ; Bth. in Linn. Proc. IV. Suppl. 46 in part only ; Hf. Ind. Fl. II. 235.

HAB. Frequent in all mixed forests from Pegu and Martaban down to Upper Tenasserim.—Fl. Febr. March ; Fr. CS.

3. *D. GLOMERIFLORA*, Kurz in Journ. As. Soc. Beng. 1873, 70 ; Hf. Ind. Fl. II. 236.

HAB. Rare in the upper mixed forests of the Yomah in the Prome District, at 1000—2000 feet elevation.—Fl. March, Apr.

4. *D. NIGRESCENS*, Kurz in Pegu Rep. App. A. 48 and B. 45.

HAB. Frequent in the dry forests, especially the mixed ones, of Prome and Ava.

N. B. Occurs also in Hindustan, where (according to Dr. Brandis) it is a sacred tree. It is very near allied to the following, and in leaf and flowerless at the time when *D. paniculata* is leafless and in full bloom.

5. *D. PANICULATA*, Roxb. Corom. Pl. II. 8. t. 114 and Fl. Ind. III. 227 ; Hf. Ind. Fl. II. 236.



HAB. Rather frequent in the mixed dry forests of Ava and Prome, occasionally found also in the drier upper mixed forests of the Pegu Yomah.—Fl. March; Fr. May, June.

6. *D. VOLUBILIS*, Roxb. Corom. Pl. II. 48. t. 191. and Fl. Ind. III. 231; Hf. Ind. Fl. II. 235.

HAB. Frequent in the mixed forests, especially the lower ones, occasionally also in the savannahs, all over Chittagong, Ava, and Martaban down to Upper Tenasserim.—Fl. Febr., March; Fr. Apr., May.

7. *D. STIPULACEA*, Roxb. Fl. Ind. III. 233; Wight Icon. t. 243; Hf. Ind. Fl. II. 237. (*D. ferruginea*, Roxb. Fl. Ind. III. 228, *teste* Baker).

HAB. Common, not only in the mixed and tropical forests, but also ascending into the drier hill-forests, all over Pegu and Martaban down to Tenasserim, up to 3500 ft. elevation; also Chittagong.—Fl. Jan., Febr.; Fr. CS.

8. *D. LATIFOLIA*, Roxb. Corom. Pl. II. 7. t. 113, and Fl. Ind. III. 221; Wight Icon. t. 1156; Bedd. Fl. Sylv. t. 24; Hf. Ind. Fl. II. 231. (*D. emarginata*, Roxb. Fl. Ind. III. 224; *D. Javanica*, Miq. Fl. Ind. Bat. I. 132; Bth. in Linn. Proc. IV. Suppl. 38).

HAB. Andaman Islands (Roxburgh).

9. *D. CULTRATA*, Grah. in Wall. Cat. 5861; Hf. Ind. Fl. II. 233.

HAB. Common in all leaf-shedding forests, especially in the savannah- and eng-forests, all over Burma, from Ava and Martaban down to Upper Tenasserim.—Fl. March, Apr.; Fr. CS.

10. *D. GLAUCA*, Wall. Cat. 5862. (*D. ovata*, var. *obtusifolia*, Bak. in Hf. Ind. Fl. II. 231).

HAB. Not unfrequent in the upper mixed forests, from the Pegu Yomah and Martaban down to Upper Tenasserim; also Ava.—Fl. Jan., Febr.; Fr. March, May.

11. *D. OVATA*, Grah. in Wall. Cat. 5854; Bth. in Linn. Proc. IV. Suppl. 39; Hf. Ind. Fl. II. 231.

Var.  $\alpha$ . *GENUINA*, quite glabrous.

Var.  $\beta$ . *PUBERULA*, leaflets beneath and panicles puberulous.

HAB. Not unfrequent in the upper mixed forests, especially along choungs, from the Pegu Yomah and the Martaban Hills down to Upper Tenasserim; var.  $\beta$ . Pegu, Irrawaddi district (Dr. Brandis).—Fl. Jan. Febr.; Fr. Apr, May.

12. *D. FOLIACEA*, Wall. Cat. 5856; Bth. in Linn. Proc. IV. Suppl. 41; Hf. Ind. Fl. II. 232.

HAB. Not unfrequent along choungs, in the upper mixed forests of the Pegu Yomah, and from Martaban down to Upper Tenasserim; also Ava.—Fl. Jan. Febr.; Fr. CS.





13. *D. RUBIGINOSA*, Roxb. Corom. Pl. II. 9. t. 115 and Pl. Ind. III. 231; Hf. Ind. II. 232.

HAB. Not unfrequent in the tropical forests around the Kambala toung, Pegu Yomah, probably on calcareous sandstone.

14. *D. TAMARINDIFOLIA*, Roxb. Hort. Bengh. 53 and Fl. Ind. III. 233; Wight Icon. t. 242; Hf. Ind. Fl. II. 234. (*Deris pinnata*, Lour. Fl. Coch. 432).

HAB. Not unfrequent in the forests of the Andamans; also Tenasserim.—Fl. May, June.

The pods of the Burmese species (= *D. rufa* and *multijuga*, Grah.) differ a good deal from those figured by Roxburgh, and they are much narrower. The pods of the Assam plant are unknown to me, but Mr. Simons calls it "a large tree 30 to 40 feet high." The matter requires further inquiry.

15. *D. VELUTINA*, Bth. in Pl. Jungh. I. 255 in adn. and in Linn. Proc. IV. Suppl. 43; Hf. Ind. Fl. II. 233.

HAB. Frequent in the tropical forests, ascending into the hill-forests up to 4000 feet elevation, from Pegu and Martaban down to Tenasserim.—Fl. March.

### *Drepanocarpus*, E. Mey.

#### *Conspectus of Species.*

*Subg. 1. Eu-Drepanocarpus.* Stamens united into a single sheath.

× Corolla glabrous. Pods usually 1-seeded. (*Selenolobium*, Bth.)

Leaflets  $\frac{1}{2}$  in. long; calyx a line long,

...*D. spinosus*.

Leaflets about an in. long; calyx  $1\frac{1}{2}$  lin. deep,

...*D. monospermus*.

× × Corolla pubescent outside. Pods usually 1-seeded. (American.)

*Subg. 2. Pongamiopsis.* Stamens united into 2 separate sheaths. Corolla glabrous.

Pods 1—3-seeded, moniliform-constricted between the seeds.

Tree; panicles rusty villous; pod-joints smoothish, dimorphous, some flat and thick coriaceous, others very thick and fleshy,

...*D. reniformis*.

Arboreous climber; panicles almost glabrous; pod-joints flat and thick-coriaceous, wrinkled-veined,

...*D. Cumingii*.

1. *D. SPINOSUS*, (*Dalbergia spinosa*, Roxb. Fl. Ind. III. 233; Hf. Ind. Fl. II. 238)

HAB. Frequent in the tidal forests along the coasts from Chittagong down to Tenasserim.—Fl. May, June; Fr. CS.

This and the following are referred by Benthams to *Dalbergia*, but the pods are not winged and the cell-cavity extends from suture to suture. Strictly speaking the pods of *Dalbergia* cannot be called winged, for the broad thin margins of the pod are simply consolidated so as to leave (as in *Pterocarpus*) only a central cavity for the seed.

2. *D. MONOSPERMUS*, (*Dalbergia monosperma*, Dalz. in Kew. Journ. Bot. II. 36; Miq. Fl. Ind. Bat. I. 132. t. 3. f. D.; Hf. Ind. Fl. II. 237).

HAB. Tidal forests of Upper Tenasserim (Falconer).—Fl. March.



3. *D. BENIFORMIS*, Kurz in Pegu Rep. App. A. 49. and B. 45. (*Dalbergia reniformis*, Roxb. Fl. Ind. III. 226; Wight Icon. t. 261; Hf. Ind. Fl. II. 238; *Dalbergia flexuosa*, Grah. in Wall. Cat. 5875; Bth. in Linn. Proc. IV. Suppl. 48).

HAB. Frequent in the swamp-forests and around lakes and marshy grounds, especially in the alluvial lands, all over Pegu and Martaban down to Upper Tenasserim.—Fl. Febr. March; Fr. Apr.—June.

Curious on account of the joints being dimorphous on the same or on different pods. They are either normally thick-coriaceous and as flat as those of the following species, and have the seeds much compressed; or they are firmly fleshy and up to half inch thick, in which case the seeds are larger and scarcely compressed. This latter state is not attributable to the agency of insects, but seems to be normal development. The full-grown foliage so much resembles that of *Dep. inundatus*, Mart., that I should experience some difficulty in distinguishing between the two species when out of flower or fruit.

4. *D. CUMINGII*, (*Dalbergia Cumingii*, Bth. in Pl. Jungh. I. 255 in adn. and in Proc. Linu. Soc. IV. Suppl. 32; *D. Zollingeriana*, Miq. Fl. Ind. Bat. I. 130).

HAB. Tenasserim (or Andamans?) (Helf. 1808.)

My plant is Miquel's *D. Zollingeriana*, which Bentham connects with the Philippine plant.

## Cassia, L.

### Conspectus of Species.

*Subg. 1. Fistula*, DC. Filaments of the 3 lower stamens very long and arcuate the others short or imperfect. Pod terete, elongate, indehiscent. Seeds horizontal.

\* *Racemes slender and elongate, drooping, destitute of bracts. Flowers yellow.*

All adult parts glabrous; calyx very deciduous, velvety; petals about an inch long,

... *C. Fistula*.

\* \* *Racemes often corymb-like, more or less erect, with persistent bracts. Flowers pale or intensely pink-coloured. (Longer filaments thickened node-like at middle).*

Leaflets shortly acuminate, on petiolules 1—2 lin. long; bracts narrowly lanceolate,

... *C. nodosa*.

Leaflets retuse or blunt, pubescent, almost sessile; bracts cordate-ovate, .... *C. renigera*.

*Subg. 2. Senna*. Perfect anthers 7 or 10, opening by terminal pores or short slits. Pods opening along one or both sutures. Seeds transverse or oblique.

\* *Pods usually not elastically opening. Funicle of seed filiform. (Senna genuina.)*

× *Pods compressed and often flat, sometimes winged. (Chamaesenna).*

+ *Perfect stamens 10 (Psilorhema).*

Leaflets bluntish or rounded, more or less glaucous beneath; flowers yellow, in corymb-like racemes; bracts small, persistent; pods black, very flat, shortly stalked,

... *C. glauca*.





- + + Perfect stamens 7. Pods much compressed. Flowers yellow.  
O Pods not winged.

+ Pods straight and acute. Trees or shrubs.

△ Stipules none or very deciduous. Trees. Petals  
 $\frac{1}{2}$  in. long.

Adult parts glabrous; bracts small, persistent, obovate with a subulate point longer than the blade; leaflets in 6—10 pairs,  $1\frac{1}{2}$ —2 in. long; pods velvety,..... *C. Siamea*.

All parts pubescent; bracts leafy, broad-ovate, about  $\frac{1}{2}$  in. long; leaflets in 10—20 pairs,  $1-1\frac{1}{4}$  in. long; pods glabrous,..... *C. Timoriensis*.

△ △ Stipules large, cordate-semilunate, persistent.

More or less pubescent; leaflets in 8—10 pairs,  $\frac{1}{2}$ — $\frac{3}{4}$  in. long; bracts ovate to obovate lanceolate, 3—4 lin. long; petals nearly an in. long; pods shortly and rather thinly pubescent,..... *C. auriculata*.

+ + Pods lunate.

Glabrous perennial; calyx glabrous; petals 3—4 lin. long; pods shortly stalked, glabrous,..... *C. obovata*.

O O Pods broadly 4-winged. Flowers large, orange-yellow.

Shrubby herb, almost glabrous; leaves abruptly pinnate, the rachis almost winged-angular; bracts yellow, obovate-oblong, about an in. long, deciduous; pods glabrous,..... *C. alata*.

× × Pods more or less terete to 4-gonous. Seeds transverse, oblique or rarely parallel with the valves. (Herbs; flowers yellow).

+ Seeds transverse or oblique.

Leaves abruptly 4 pinnate, glabrous, leaflets in 4—12 pairs, acuminate; calyx glabrous; petals about  $\frac{1}{2}$  in. long; ovary glabrous,..... *C. occidentalis*.

+ + Seeds parallel with the valves.

Leaves abruptly pinnate, leaflets in 3—2 pairs, blunt; petals nearly  $\frac{1}{2}$  in. long; ovary shortly pubescent,..... *C. Tora*.

\* \* Pods opening elastically at both sutures. Funicle very short. Perfect anthers 10 or fewer by abortion, opening by slits. Herbs; flowers yellow, small (*Lasiurhegma*).

More or less prostrate; leaflets in 8—15 pairs,  $2\frac{1}{2}$ — $3\frac{1}{2}$  lin. long; basal gland of rachis long-stalked; pedicels 1—2 lin. long,..... *C. pumila*.

Erect, branched; leaflets in 15—30 pairs, 1—3 lin. long; basal glands of rachis sessile; pedicels up to  $\frac{1}{2}$ — $\frac{3}{4}$  in. long,..... *C. mimosoides*.

1. *C. FISTULA*, L. sp. pl. 440; WA. Prod. I. 285; Roxb. Fl. Ind. II. 333; Bth. in Linn. Trans. XXVII. 514. (*Cathartocarpus Fistula*, Pers. Syn. I. 459; Wight Icon. t. 269; *C. rhombifolia*, Roxb. Fl. Ind. II. 334).

HAB. Frequent in the leaf-shedding forests, especially in the savannah and mixed ones, all over Burma and adjacent provinces.—Fl. Apr.; Fr. CS.

2. *C. NODOSA*, Ham. in Roxb. Fl. Ind. II. 336; Wight Icon. t. 410; Bth. in Linn. Trans. XXVII. 517. (*Cathartocarpus nodosus*, Voigt Hort. Suburb. Calc. 248.)

HAB. Rather rare in the tropical forests of Martaban down to Upper Tenasserim; also Chittagong.—Fl. Apr.; Fr. CS.



3. *C. RENIGERA*, Wall. Cat. 5307; Bth. in Linn. Trans. XXVII. 518; Kurz in Journ. As. Soc. Beng. 1873. 71.

HAB. Not unfrequent in the dry forests of Prome and Ava; also Martaban? (Poungloungh hills above 2000 feet, Dr. Brandis).—Fl. Apr. Fr. Nov.

4. *C. GLAUCA*, Lamk. Diet. I. 647; Bth. in Linn. Trans. XXVII. 555. (*Senna arborescens*, Roxb. Fl. Ind. II. 345; *Senna speciosa*, Roxb. l. c. 347; *C. suffruticosa*, Koen. in Roth. Nov. sp. pl. 213).

Var.  $\alpha$ . GENUINA, all parts more glabrous; leaflets larger, bluntish or acute, more glaucous beneath.

Var.  $\beta$ . KENIGH, (*C. fruticosa*, Koen. l. c.; *C. speciosa*, Roxb. l. c.) the young parts more pubescent; leaflets  $\frac{1}{2}$ —1 in. only long, retuse or rounded, less glaucous beneath.

HAB. Var.  $\alpha$ . not unfrequent in the dry forests of Ava and Prome, especially along the courses of rivers, var.  $\beta$ . only seen cultivated around khyoungs, etc., in Pegu.—Fl. Fr.  $\infty$ .

5. *C. SIAMEA*, Lamk. Diet. I. 648; Bth. in Linn. Trans. XXVII. 549. (*C. florida*, Vhl. Symb. III. 57; *C. Sumatrana*, Roxb. Hort. Beng. 31; DC. Prod. II. 506; *Senna Sumatrana*, Roxb. Fl. Ind. II. 347).

Var.  $\alpha$ . GENUINA, leaves glabrous, the leaflets more glaucous beneath; a large tree.

Var.  $\beta$ . PUBERULA, rachis of leaves puberulous, leaflets puberulous (especially while young) but less glaucescent beneath; a low rather stunted tree.

HAB. Var.  $\alpha$ . rather frequent in the mixed forests (chiefly the upper ones) from Chittagong and Ava down to Tenasserim; var.  $\beta$ . restricted to the forests of Ava and Prome.—Fl. Nov. Jan.; Fr. March, Apr.

6. *C. TIMORIENSIS*, DC. Prod. II. 499; Miq. Fl. Ind. Bat. I. 99; Bth. in Linn. Trans. XXVII. 550. (*C. palmata*, Wall. Cat. 5306; Walp. Rep. I. 827).

HAB. Frequent in the mixed and dry forests, but more especially along choungs in the upper mixed forests, all over Burma, from Ava down to Tenasserim.—Fl. Sept. Oct.; Fr. CS.

7. *C. AURICULATA*, L. sp. pl. 542; Bth. in Linn. Trans. XXVII. 547. (*Senna auriculata*, Roxb. Fl. Ind. II. 349).

HAB. Apparently frequent in the Irrawaddi valley of Ava.—Fl. Sept.—Febr.

8. *C. OBOVATA*, Collad. Hist. Cass. 92. t. 15; Bth. in Linn. Trans. XXVII. 553. (*Senna obtusa*, Roxb. Fl. Ind. II. 344; *Cassia obtusa*, Roxb. Hort. Bengh. 31; Wight Icon. t. 757).

HAB. Ava, Yenang-choung in the Irrawaddi valley (Wall.).

9. *C. ALATA*, L. sp. pl. 541; Wight Icon. t. 253; Bth. in Linn.





Trans. XXVII. 550 ; Griff. Not. Dicot. 448. (*Senna alata*, Roxb. Fl. Ind. II. 349).

HAB. Generally cultivated all over Burma, and often springing up in waste places and poonzohs ; apparently wild in Tenasserim.—Fl. Nov. —Decb. ; Fr. Febr.

10. *C. OCCIDENTALIS*, L. sp. pl. 539 ; Bot. Reg. t. 83 ; Bth. in Linn. Trans. XXVII. 532. (*Senna occidentalis*, Roxb. Fl. Ind. II. 343 ; *C. Sophora*, L. sp. pl. 542 ; Bth. l. c. ; *Senna Sophora*, Roxb. l. c. 347).

HAB. Common in rubbishy places, along banks of rivers, in fallow fields and poonzohs, all over Burma and adjacent provinces.—Fl. Fr.  $\infty$ .

11. *C. TORA*, L. sp. pl. 538 ; Bth. in Linn. Trans. XXVII. 535. (*Senna Tora*, Roxb. Fl. Ind. II. 340 ; *Senna toroides*, Roxb. l. c. 341).

Var.  $\alpha$ . *GLABRA*, all parts glabrous or nearly so.

Var.  $\beta$ . *PUBESCENS*, all parts appressedly (often greyish) pubescent.

HAB. Common, not only in the leaf-shedding forests, but also in waste places, along river-sides, on neglected culture-land, etc., all over Burma and the adjacent provinces ; var.  $\beta$ . in similar places in the dry Prome district.—Fl. Fr.  $\infty$ .

12. *C. PUMILA*, Lamk. Diet. I. 651 ; Bth. in Linn. Trans. XXVII. 570. (*Senna prostrata*, Roxb. Fl. Ind. II. 352).

HAB. Prome district, in the dry forests.—Fl. Fr. Close of RS.

13. *C. MIMOSOIDES*, L. sp. pl. 543 ; Vog. in Linn. XI. 714 ; Bth. in Linn. Trans. XXVII. 579.

Var.  $\alpha$ . *TYPICA*, Bth. l. c. (*C. angustissima*, Lamk. Diet. I. 650 ; *C. mimosoides*, var. *Telfairiana*, Hook. Bot. Mag. t. 5874 ; *Senna sensitiva* and *S. tenella*, Roxb. Fl. Ind. II. 353 and 354), leaves almost sessile, the rachis often marginate ; leaflets only about a line long, very narrow ; pods nearly glabrous. All parts more or less glabrous.

Var.  $\beta$ . *ÆSCHYNOMENE*, Bth. l. c. (*C. myriophylla*, Wall. Cat. 5326 ; *C. mimosoides*,  $\beta$ . *myriophylla* and *auricoma*, Bth. l. c. ; *Senna dimidiata*, Roxb. Fl. Ind. II. 352), leaves on a short pubescent petiole ; leaflets 2—3 lin. long, broader or narrower oblong to linear, the rachis marginate or not ; pods more copiously appressed pubescent, while young usually pilose from yellow soft spreading hairs.

HAB. Var.  $\alpha$ . common amongst long grass in the jungle-pastures and savannahs, also entering the open and dry forests, all over Burma ; var.  $\beta$ . a shade-loving form in similar localities in Tenasserim.—Fl. Fr. R. and begin. of CS.



**Bauhinia, L.***Conspectus of Genera.*

\* Trees or erect shrubs, without tendrils.

*Subg. 1. Pileostigma*, Hochst. Stamens 10, all fertile. Style very short or wanting, the stigma peltate. Flowers small.

Calyx valvate, the segments all free; glabrous trees, ..... *B. Malabarica*.

Calyx spathaceous; young shoots and underside of leaves pubescent, .... *B. racemosa*.

*Subg. 2. Eu-Bauhinia*. Stamens 10, of which 5—9 sterile or reduced to staminodes, very rarely all 10 fertile.

× Calyx spathaceous.

+ Pods sessile or acuminate and barely stalked.

Pods minutely tomentose, ..... *B. brachycarpa*.

Pods glabrous, ..... *B. polycarpa*.

+ + Pods long-stalked.

Fertile stamen one only; leaves shortly pubescent beneath, ..... *B. monandra*.

Fertile stamens 5; young shoots puberulous; leaves glabrous, ..... *B. variegata*.

× × Calyx-lobes valvate, reflexed and free to the base, or only slightly cohering. Pods long-stalked.

+ Pods glabrous. Petals white or purple.

A shrub, the leaves minutely puberulous beneath; calyx in bud terete, .. *B. acuminata*.

A tree, the leaves glabrous; calyx angular in bud, irregularly bursting, .. *B. purpurea*.

+ + Pods brown-pubescent. Flowers yellow, turning orange-coloured.

Leaves velvety; a small tree, ..... *B. elongata*.

\* \* Scandent shrubs, with hook-tendrils.

*Subg. 3. Phanera*. Lour. Calyx-tube more or less elongate. Calyx-lobes valvate, all expanding or becoming reflected, rarely the one or other cohering. Style more or less elongate.

× Ovary and pod glabrous.

O Pod stalked. Flowers racemose, large.

Leaves 2-foliolate, the leaflets free to the base; bracts or bractlets none, .... *B. diphylla*.

Leaflets united into a 2-cleft leaf; bractlets very large, almost leafy, .... *B. involucellata*.

O O Pod sessile. Flowers rather small, corymbose.

Lobes of the leaves rounded; pedicels and calyx glabrous, ..... *B. glauca*.

Lobes of the leaves acuminate; pedicels and calyx appressed silk-hairy, .. *B. piperifolia*.

× × Ovary, and usually also the pod, villous, pubescent or puberulous.

O Pod and ovary sessile.

† Adult leaves glabrous, the lobes acuminate to acute and blun-tish.

Racemes elongate, appressed silk-hairy; pedicels stout, ..... *B. macrostachya*.

Racemes corymb-like contracted, sparingly puberulous; pedicels slender, .... *B. ornata*.

† † Leaves tomentose or pubescent, the lobes rounded.

All parts brown-tomentose or pubescent; petals an inch long; racemes elongate,

.. *B. Vahlîi*.

O O Pod and ovary stalked.

Flowers rose-coloured, in corymb-like racemes; style shorter than the ovary, villous, thick, ..... *B. rosea*.





Flowers yellowish white to yellow, in short racemes ; style elongate, slender,

... *B. ferruginea*.

*Subg. 4. Lasiobema*, Korth. Calyx-tube almost none, the lobes tooth-like. Style very short. Pods 1—2-seeded.

Glabrous or nearly so ; ovary and pods glabrous, ..... *B. anguina*.

1. *B. MALABARICA*, Roxb, Fl. Ind. II. 321 ; WA. Prod. I. 294. (*Pileostigma Malabaricum*, Bth. in Pl. Jungh. 261, in adn. ; Miq. Fl. Ind. Bat. I. 73).

HAB. Frequent in the upper mixed forests, rarely descending into the lower and the savannah forests, of Pegu ; and probably elsewhere.—Fl. Fr. CS.

2. \* *B. RACEMOSA*, Lamk. Encycl. Meth. I. 390, non Vhl. ; WA. Prod. I. 295 ; Bedd. Fl. Sylv. t. 182. (*B. parviflora*, Vhl. Symb. III. 55 ; Roxb. Fl. Ind. II. 323 ; *Pileostigma racemosum*, Bth. in Pl. Jungh. 262, in adn. ; Miq. Fl. Ind. Bat. I. 73).

HAB. Common in the dry forests of the Prome district ; most probably also in Ava.—Fl. Fr. March, Apr.

3. *B. BRACHYCARPA*, Wall. Cat. 5786 ; Bth. in Pl. Jungh. 261 in adn.

HAB. Ava, Taong-dong (Wall.).

Unknown to me. The brief and incomplete description does not allow even of a guess as to its affinities.

4. *B. POLYCARPA*, Wall. Cat. 5785 ; Bth. in Pl. Jungh. 261 in adn.

HAB. Frequent in the upper mixed forests, from Pegu and Martaban down to Upper Tenasserim.—Fl. Apr. May ; Fr. CS.

5. *B. MONANDRA*, Kurz in Journ. As. Soc. Beng. 1873, 73.

HAB. Burma, "Soeh doh" probably in Martaban or Upper Tenasserim (Brandis).

6. *B. VARIEGATA*, L. sp. pl. 535 ; Roxb. Fl. Ind. II. 319 ; WA. Prod. I. 296.—(*Phanera variegata*, Bth. in Pl. Jungh. I. 262 in adn. ; Miq. Fl. Ind. Bat. I. 60).

Var. *a. PURPURASCENS*, Voigt Cat. Hort. Calc. 253 (*B. variegata*, L. l. c. ; Roxb. l. c.), the 4 narrower petals purple, the fifth broader one tinged with cream and red.

Var. *β. CANDIDA*, Voigt l. c. (*B. candida*, Roxb. Fl. Ind. II. 318, non Ait.), the 4 narrower petals white or very pale purple, the fifth lower one somewhat sulphur-coloured in the centre, or purple towards the borders and yellow in the centre.

HAB. Var. *β.* chiefly, common in the dry forests and ascending into the upper dry forests of Ava and Prome ; Martaban, in the Yoonzeleen valley (Parish).—Fl. Febr. March ; Fr. CS.

7. *B. PURPUREA*, L. sp. pl. 536 ; Roxb. Fl. Ind. II. 320.—(*Phanera purpurea*, Bth. in Pl. Jungh. I. in adn. ; Miq. Fl. Ind. Bat. I. 60).





Var.  $\alpha$ . GENUINA, flowers purple.

Var.  $\beta$ . TRIANDRA (*B. triandra*, Roxb. Fl. Ind. II. 320), flowers white, often with a yellowish blotch on the lower petal.

HAB. Var.  $\alpha$ . sometimes planted in Burmese villages, as for example near Henzadah etc. ; var.  $\beta$ . Ava, banks of the Irrawaddi (Wall. Cat. 5797 L.)—Fl. CS.

8. *B. ACUMINATA*, L. sp. pl. 536 ; Roxb. Fl. Ind. II. 324 ; WA. Prod. I. 295 ; Miq. Fl. Ind. Bat. I. 74. (*B. isopetala*, Griff. Not. Dicot. 451).

HAB. Frequent in the open forests, especially the eng-forests, all over Burma.—Fl. March—May ; Fr. CS.

9. *B. ELONGATA*, Korth in Nat. Verh. Bot. 89. t. 24. (*Phanera elongata*, Bth. in Pl. Jungh. I. 262, in adn. ; Miq. Fl. Ind. Bat. I. 61 ; *B. mol-lissima*, Wall. Cat. 5782 ; *Phanera velutina*, Bth. in Pl. Jungh. I. 262, in adn. ; Miq. Fl. Ind. Bat. I. 63 ; *Bauhinia* sp., Griff. Not. Dicot. 451).

HAB. Pegu, in the tropical forests above Rangoon (Cleghorn) ; Tenasserim from Moulmein to Tavoy (Helf. 1872 ; Wall. etc.)—Fl. Decb. Jan.

10. *B. DIPHYLLA*, Symes Trav. to Ava t. 7.—(*Phanera diphylla*, Bth. in Pl. Jungh. 264, in adn. ; Miq. Fl. Ind. Bat. I. 70).

HAB. Frequent in the dry forests of Ava and Prome.—Fl. RS. ; Fr.  $\infty$ .

11. *B. INVOLUCELLATA*, Kurz in Journ. As. Soc. Beng. 1873, 72.

HAB. Martaban (Dr. Brandis).

12. *B. GLAUCA*, Wall. Cat. 5785 (*Phanera glauca*, Bth. in Pl. Jungh. 265 ; Miq. Fl. Ind. I. 68. t. 2).

HAB. Tenasserim, apparently frequent ; also tropical forests above Rangoon (Cleghorn).—Fl. March, Jan. ; Fr. Febr.

13. *B. PIPERIFOLIA*, Roxb. Fl. Ind. II. 327. (*Phanera glabrifolia*, Bth. in Pl. Jungh. 263, in adn.).

HAB. Tenasserim (Helf. 1879 and 1880).

NB. *B. LUCIDA*, Wall. (*Phanera lucida*, Bth. in Pl. Jungh. 262, in adn. = *B. cordifolia*, Roxb.).

14. *B. MACROSTACHYA*, Wall. Cat. 5774.—(*B. scandens*, Roxb. Fl. Ind. II. 326, non L. ; Wight Icon. t. 264).

HAB. Ava, Khakyen hills, east of Bhamo (J. Anderson).

15. *B. ORNATA*, Kurz in Journ. As. Soc. Beng. 1873, 72.

HAB. Frequent in the tropical forests, along choungs of the eastern slopes of the Pegu Yomah.—Fl. Febr.

16. *B. VAHLII*, WA. Prod. I. 297. (*Phanera VahlII*, Bth. in Pl. Jungh. 263, in adn. ; Miq. Fl. Ind. Bat. I. 65 ; *Phanera rufa*, Bth. in Pl. Jungh. 263, in adn. ? ; *B. racemosa*, Vhl. Symb. III. 56. t. 62, non Lamk. ; Roxb. Fl. Ind. II. 325).



HAB. Tenasserim, near Moulmein (J. Anderson, 1866).

17. B. ROSEA. Kurz in Journ. As. Soc. Beng. 1873, 72.

HAB. Martaban, in the eng-forests of Kaymapyoo choung (Dr. Brandis).—Fl. May.

18. B. FERRUGINEA, Roxb. Fl. Ind. 331; Korth in Nat. Verh. Bot. 93. t. 23 (*Phanera ferruginea*, Bth. in Pl. Jungh. 262, in adn.; Miq. Fl. Ind. Bat. I. 62; *Phanera excelsa*, Bl. ap. Miq. l. c.; *Phanera albolutea*, Miq. Suppl. Fl. Sum. 285; *Phanera Griffithiana*, Bth. in Pl. Jungh. 263, in adn.).

HAB. Tropical forests of the Martaban Hills, east of Tounghoo, at 2000 to 3000 feet elevation.

19. B. ANGUINA, Roxb. Corom. Pl. III. t. 285 and Fl. Ind. II. 728. —(*Lasiobema anguinum*, Korth. in Verh. Nat. Gesch. 84; Miq. Fl. Ind. Bat. I. 71; *Lasiobema Horsfieldii*, Miq. l. c.).

HAB. Not unfrequent in the tropical forests of Martaban, east of Tounghoo; also Chittagong.—Fl. RS.

### Cynometra, L.

#### Conspectus of Species.

× Racemes short and umbel-like, puberulous.

Leaves and rachis glabrous; leaflets larger, usually in a single pair;  $1\frac{1}{2}$ —2 in. long, edible, ..... *C. ramiflora*.

Rachis of leaves puberulous, slenderer; leaflets smaller, usually in 2, very rarely in 3 pairs; pods about  $\frac{1}{2}$  in. long, insipid, ..... *C. bijuga*.

× × Racemes longer or shorter, bracted.

Pedicels glabrous or puberulous; leaflets in a single pair, ..... *C. cauliflora*.

1. C. RAMIFLORA, L. sp. pl. 547; Miq. Fl. Ind. Bat. I. 78; Bth. Fl. Austr. II. 296.

HAB. Rarely planted in villages of Tenasserim.

2. C. BIJUGA, Spanoghe in Miq. Fl. Ind. Bat. I. 78.

HAB. Frequent in the tidal and the beach-forests along the coasts, from Arracan down to Tenasserim and the Andamans.—Fl. Octob.; Fr. CS.

3. C. CAULIFLORA, L. sp. pl. 547; Miq. Fl. Ind. Bat. I. 77?

HAB. Burma, planted (according to the Revd. F. Mason).

### Sindora, Liq.

1. S. SIAMENSIS, Teysm. in Miq. Ann. Mus. Lugd. Bat. III. 86. (*S. Wallichii*, Bth. in Hook. Icon. t. 1017—18).

HAB. Adjoining Siamese provinces.—Fl. Begin of RS.; Fr. HS.

### Pahudia, Miq.

#### Conspectus of Species.

Leaflets in 5 pairs, thin coriaceous, rounded or apiculate, the rachis and petiolules stout; sepals about 3 lin. long, ..... *P. Javanica*.





Leaflets in 2 pairs, blunt or emarginate, thin chartaceous, glaucescent beneath, the rachis and petiolules very slender; sepals 2 lin. long; pods woody, 3—4 in. long, very thick and plump, ..... *P. xylocarpa*.

1. *P. XYLOCARPA*, Kurz MS.

HAB. Adjoining provinces of Siam (Teysmann).

*P. Hasskarlii*, Miq., has also only two pairs of leaflets, but Hasskarl's description of *Jonesia monopetala* (Retzia I. 199), and more especially of the pod, clearly points to *Macrolobium*.

**Afzelia, Sm.**

*Conspectus of Species.*

Inflorescence and calyx puberulous; pods  $\frac{1}{2}$ —1 foot long, woody; leaflets usually blun-  
tish, ..... *A. bijuga*.

Inflorescence and calyx glabrous; pods 3—4 in. long, thin coriaceous; leaflets notched,  
..... *A. retusa*.

1. *A. BIJUGA*, A. Gray Unit. Stat. Expl. 467. t. 51; Walp. Ann. IV. 594.—(*Macrolobium bijugum*, Colebr. in. Linn. Trans. XII. t. 19; *Jonesia triandra*, Roxb. Fl. Ind. II. 220).

HAB. Not unfrequent in the coast-forests and beach-jungles of the Andamans.—Fl. May, June; Fr. Apr.

2. *A. RETUSA*, Kurz in Journ. As. Soc. Beng. 1873, 73.

HAB. Not unfrequent in the tidal forests along the coasts of the Andaman islands.—Fl. May.

**Tamarindus, L.**

\*1. *T. INDICA*, L. sp. pl. 48; Roxb. Fl. Ind. III. 215; Heyne Arznei Gew. t. 221; Miq. Fl. Ind. Bat. I. 82; Bedd. Fl. Sylv. t. 184. (*T. officinalis*, Hook. Bot. Mag. t. 4563).

HAB. Generally cultivated in villages all over Burma, more especially in the drier parts, but apparently nowhere wild.—Fl. HS.; Fr. CS.

**Amherstia, Wall.**

1. *A. NOBILIS*, Wall. Pl. As. rar. I. t. 1 and 2; Miq. Fl. Ind. Bat. I. 87; Bot. Mag. t. 4453.

HAB. Planted around kyouks, chiefly in the southern parts of Burma; wild along streams in Martaban (Parish); Tenasserim.—Fl. Jan.—Apr.

**Saraca, L.**

1. *S. INDICA*, L. Mant. 98; Miq. Fl. Ind. Bat. I. 83; Bedd. Fl. Sylv. t. 57. (*Jonesia Asoca*, Roxb. Fl. Ind. II. 218; Bot. Mag. t. 3018; Wight Icon. t. 206; *Jonesia Zollingeriana*, Miq. l. c. 84).

HAB. Wild in the tropical forests of Arracan (Boronga Island, at 1000 feet elevation); also Tenasserim; much planted around monasteries all over the country.—Fl. Octob.



**Poinciana, L.***Conspectus of Species.*

Calyx greyish velvety ; petals crispate-fimbriate, yellow, ..... *P. elata*.

Calyx quite glabrous ; petals very large, waved, usually crimson or orange-crimson,  
..... *P. regia*.

\*1. *P. REGIA*, Boj. in Bot. Mag. t. 2884.

HAB. Frequently cultivated in the European stations all over Pegu.

—Fl. H. and RS. ; Fr. R. and CS.

**Parkinsonia, L.**

\*1. *P. ACULEATA*, L. Hort. Cliff. 157. t. 13 ; WA. Prod. I. 283 ; Griff. Not. Dicot. 447.

HAB. Frequently planted in Ava and Prome, and in the last-named district often like wild in woods and neglected lands.—Fl. nearly  $\infty$ .

**Cæsalpinia, L.***Conspectus of Species.*

*Subg. I. Cæsalpinaria.* Albumen none. Pods coriaceous, 2-valved. Filaments very long and slender, quite glabrous. Erect shrubs or trees, unarmed.

A glabrous shrub, the branchlets more or less pruinous, ..... *C. pulcherrima*.

*Subg. II. Eu-Cæsalpinia.* Seeds albuminous. Pods various. Filaments as long as, or somewhat longer than, the petals. Usually scandent shrubs more or less armed with prickles.

A. Valves of pod dry, coriaceous or almost chartaceous.

*Trib. 1. Nugaria*, DC.—Scandent thorny shrubs, rarely trees. Pods rigidly or thinly coriaceous, 2-valved or indehiscent, smooth. Seeds compressed or not. Stamens as long as, or a little longer than, the petals.

\* *Seeds flat and compressed. Pods 2-valved. Leaflets large.*

All parts quite glabrous, ..... *C. nuga*.

\* \* *Seeds hardly compressed. Pods 2-valved or indehiscent or nearly so, the sutures usually thickened. Leaflets small.*

Small tree ; leaflets unequally oblong, retuse ; pods tardily dehiscing, ..... *C. sappan*.

Scandent shrubs ; leaflets ovate, acute ; pods 2-valved, ..... *C. sepiaria*.

*Trib. 2. Guilandina*, L.—Scandent thorny shrubs. Pods coriaceous or thin coriaceous, 2-valved, the valves echinate or glandular-hirsute. Seeds not compressed. Stamens as long as, or somewhat longer than, the petals.

\* *Pods echinate. Seeds almost globose.*

Branchlets etc. more or less brown or tawny-pubescent ; stipules large, cut into large segments ; bracts at apex spreading or reflexed, ..... *B. Bonducella*.

As preceding, but leaves more glabrescent ; stipules none ; bracts straight and erect,  
..... *C. Bondhuc*.

\* \* *Pods glandular-hirsute when fully ripe. Seeds oblong.*

All parts more or less glandular-puberulous and prickly, ..... *C. mimosoides*.

B. Pods fleshy-coriaceous, torose.





*Trib. 3. Cinclidocarpus*, Zoll.—Thorny scandent shrubs. Pods indehiscent, the sutures thickened. Seeds not compressed. Stamens as long as, or somewhat longer than, the petals.

Panicle shortly tomentose and prickly, ..... *C. tortuosa*.  
Panicle glabrous and unarmed, ..... *C. digyna*.

\*1. *C. PULCHERRIMA*, Sw. Obs. 165; Miq. Fl. Ind. Bat. I. 112. (*Poinciana pulcherrima*, L. sp. pl. 554; DC. Prod. II. 484; Roxb. Fl. Ind. II. 355; Bot. Mag. t. 995).

HAB. Generally cultivated in villages, especially around monasteries etc., all over the country.—Fl. Fr.  $\infty$ .

2. *C. NUGA*, Ait. Hort. Kew III. 32; DC. Prod. II. 481; Miq. Fl. Ind. Bat. I. 108.—(*C. paniculata*, Roxb. Fl. Ind. II. 364; Wight Icon. t. 36; Griff. Not. Dicot. 446; *C. Chinensis*, Roxb. l. c. 361).

HAB. Rather frequent along the coasts, especially in the beach-forests, from Arracan down to Tenasserim and the Andamans.—Fl. May—Octob.

3. *C. SAPPAN*, L. sp. pl. 544; Roxb. Corom. Pl. I. t. 16; Miq. Fl. Ind. Bat. I. 101.

HAB. Frequent in the Tenasserim Provinces; Pegu, Rangoon (Wall).—Fl. Aug.

4. *C. SEPIARIA*, Roxb. Fl. Ind. II. 360; Miq. Fl. Ind. Bat. I. 109; Wight Icon. t. 37.—(*Reichardia? decapetalum*, Roth. Nov. Spec. 210; DC. Prod. II. 484).

HAB. Burma (according to the Revd. F. Mason).

5. *C. BONDHUC*, Roxb. Fl. Ind. II. 362. (*Guilandina Bondhuc*, L. sp. pl. 545; Miq. Fl. Ind. Bat. I. 113).

HAB. Not unfrequent in the leaf-shedding forests of Burma, from Prome and Martaban down to Tenasserim and the Andamans.—Fl. RS.; Fr.  $\infty$ .

6. *C. MIMOSOIDES*, Lamk. Encycl. Meth. I. 457 and III. t. 335. f. 2; WA. Prod. I. 281; Wight Icon. t. 392.—(*C. Simora*, Ham. in Roxb. Fl. Ind. 359).

HAB. Frequent in the low forests of the Sittang zone of Pegu, especially about Tounghoo.—Fl. Fr. March, Apr.

7. *C. TORTUOSA*, Roxb. Fl. Ind. II. 365; Miq. Fl. Ind. Bat. I. 109. (*C. acanthobotrya*, Miq. Suppl. Fl. Fl. Sum. 108 and 293).

HAB. Tenasserim, Tavoy (Wall. Cat. 5827. C.).—Fl. Octob.

8. *C. DIGYNA*, Roth. in Nov. Act. Nat. Cur. Berol. 1803. 198. t. 3; WA. Prod. I. 281.—(*C. olcosperma*, Roxb. Fl. Ind. II. 357; *C. gracilis*, Miq. in Fl. Ind. Bat. I. 110).

HAB. Frequent along choungs in the open forests, but more so in shrubberies around villages, all over Burma, from Ava and Martaban down to Tenasserim.—Fl. Jul.—Octob.; Fr. Jan.—Apr.



**Pterolobium, R.Br.**

1. *P. MACROPTERUM*, Kurz in Journ. As. Soc. Beng. 1873, 71.

HAB. Frequent in the mixed forests, from Pegu and Martaban down to Tenasserim.—Fr. Jan.

**Mezoneurum, Desf.***Conspectus of Species.*

Leaflets in 10 to 8 pairs,  $\frac{1}{2}$  in long, blunt or retuse, ..... *M. glabrum*.

Leaflets in 3—4 pairs,  $1\frac{1}{2}$ —2 in. long, bluntnish acuminate, ..... *M. cucullatum*.

1. *M. GLABRUM*, Desf. Mém. Mus. IV. 245. t. 10; Miq. Fl. Ind. Bat. I. 103.

Var. *a. GENUINUM*, glabrous or nearly so; leaflets usually alternate.

Var. *β. ENNEAPHYLLUM* (*M. enneaphyllum*, WA. Prod. I. 283, in adn.; Miq. Fl. Ind. Bat. I. 104. t. 2; *Cæsalpinia enneaphylla*, Roxb. Fl. Ind. II. 363), glabrous or the secondary rachises and young shoots slightly puberulous; leaflets glabrous or nearly so, usually opposite.

Var. *γ. PUBESCENS* (*M. pubescens*, Desf. in Mém. Mus. IV. 245. t. 2; Miq. Fl. Ind. Bat. I. 104), the young parts more or less velvety pubescent or puberulous; leaflets opposite or nearly so, at least beneath more or less shortly pubescent.

HAB. Var. *β.* frequent in the lower and upper mixed forests, more especially around villages and along shrubby banks of rivers, in the Irrawaddy zone of Pegu; var. *γ.* not unfrequent in the dry forests of the Prome district.—Fr. CS.

2. *M. CUCULLATUM*, WA. Prod. I. 283. (*Cæsalpinia cucullata*, Roxb. Fl. Ind. II. 358; *M. macrophyllum*, Bl. ap. Miq. Fl. Ind. Bat. I. 104).

HAB. Frequent in the mixed and the dry forests, all over Burma, from Ava and Chittagong to Pegu and Martaban.—Fl. Febr. March; Fr. Nov.

**Peltophorum, Vog.***Conspectus of Species.*

Pedicels only 2—3 lin. long; pods with coriaceous wings, ..... *P. ferrugineum*.

Pedicels 1— $1\frac{1}{2}$  in. long; pods with thin chartaceous wings, ..... *P. dasyrachis*.

1. *P. FERRUGINEUM*, Bth. in Fl. Austr. II. 279. (*Cæsalpinia ferruginea*, Dene. in Nouv. Ann. d. Mus. II. 462; Miq. Fl. Ind. Bat. I. 111).

HAB. Not unfrequent in the coast-forests, chiefly the beach-forests, of the Andaman islands.—Fl. May.

**Acrocarpus, Wight.***Conspectus of Species.*

Flowers dirty purple or brown, small; petals 2 lin. long or somewhat longer; pods

8—12-seeded, ..... *A. grandis*.



Flowers green, twice the size; petals 3 lin. long or longer; pods 17—18-seeded,

...*A. fraxinifolius*.

1. *A. FRAXINIFOLIUS*, Wight Icon. t. 254; Bedd. Fl. Sylv. t. 44.

HAB. Frequent in the tropical forests of the Pegu Yomah.—Fl. Jan. Febr.; Fr. Apr. May.

### *Adenanthera*, L.

1. *A. PAVONINA*, L. sp. pl. 550; Roxb. Fl. Ind. II. 370; Wight Ill. t. 80; Miq. Fl. Ind. Bat. I. 46; Bth. in Linn. Trans. XXX. 375; Bedd. Fl. Sylv. t. 46.—(*Entada arborea*, Griff. Not. Dicot. 452; *A. Gersanii*, Scheffer in Nat. Tydsch. Ned. Ind. 1868. 16?).

Var.  $\alpha$ . *GENUINA*, seeds about  $\frac{1}{2}$  in. in diameter.

Var.  $\beta$ . *MICROSPERMA* (*A. microsperma*, T. and B. in Nat. Tydsch. v. Ned. Ind. XXVII. 58; Bth. in Linn. Trans. XXX. 375), seeds half the size.

HAB. Var.  $\beta$ . frequent in the tropical and moister upper mixed forests, all over Burma and the adjacent islands, up to 3000 feet elevation. Fl. Apr. May; Fr. CS.

### *Entada*, Adams.

1. *E. SCANDENS*, Bth. in Hook. Journ. Bot. IV. 332 and Linn. Trans. XXX. 363.—(*Mimosa scandens*, L. sp. pl. 1501; Roxb. Fl. Ind. II. 554; *E. Purshaeta*, DC. Prod. II. 425; Miq. Fl. Ind. Bat. I. 45; Scheff. in Nat. Tydsch. Ned. Ind. XXXII. 90. t. 16 and 18 A; *Entada* sp., Griff. Not. Dicot. 452; *E. Rumphii*, Scheff. in Nat. Tydschr. Ned. Ind. XXXII. t. 17. and 18. B.).

HAB. Frequent in all mixed forests, all over Burma and the adjacent islands.—Fl. March, Apr.; Fr. CS.

### *Neptunia*, Lour.

1. *N. OLERACEA*, Lour. Fl. Cochinch. II. 840; Miq. Fl. Ind. Bat. I. 50; Bth. in Linn. Trans. XXX. 383.—(*Desmanthus natans*, Willd. sp. pl. IV. 1044; Griff. Not. Dicot. 453; *Mimosa natans*, Roxb. Corom. Pl. II. t. 119 and Fl. Ind. II. 553; *N. plena*, Ldl. Bot. Neg. t. 3, non Bth.).

HAB. Not unfrequent in stagnant waters and swamps of the alluvial plains of Pegu, Martaban, and Tenasserim.—Fl. RS.; Fr. CS.

### *Mimosa*, L.

1. *M. PUDICA*, L. sp. pl. 1501; Bth. in Hook. Journ. Bot. IV. 367; and in Linn. Trans. XXX. 397; Miq. Fl. Ind. Bat. I. 43.

HAB. An introduced weed, but now very common on dry grassy places, along road-sides, etc., of the more cultivated parts of Pegu, especially around Rangoon; also in Martaban, Ava, etc.—Fl. RS.; Fr. Sept.



### Xylia, Bth.

1. X. DOLABRIFORMIS, Bth. in Hook. Journ. Bot. IV. 417; and in Linn. Trans. XXX. 373; Bedd. Fl. Sylv. t. 186; Miq. Fl. Ind. Bat. I. 42. —(*Mimosa xylocarpa*, Roxb. Corom. Pl. I. t. 100 and Fl. Ind. II. 543).

HAB. Common in the mixed and dry forests, all over Burma and the adjacent provinces, up to 3000 feet elevation.—Fl. March, Apr.; Fr. CS.

### Parkia, RBr.

#### Conspectus of Species.

\* *Calyx-lobes obovate-cuneate.*

Leaflets an inch long, pubescent beneath, penninerved; receptacle regular, . . . *P. insignis*.

\* \* *Calyx-lobes short, rotundate (not cuneate-narrowed.)*

Leaflets  $\frac{1}{2}$  in. long, quite glabrous, 1-nerved with a lateral basal nerve; receptacle irregular, . . . . . *P. leiophylla*.

Leaflets  $\frac{1}{2}$ — $\frac{1}{3}$  in. long, very narrow, sparingly pubescent beneath, 1-nerved without lateral nerves; receptacle regular, . . . . . *P. Roxburghii*.

1. P. INSIGNIS, Kurz. in Journ. As. Soc. Beng. 1873, 74; Bth. in Linn. Trans. XXX. 361.

HAB. Not unfrequent in the tropical forests of Martaban, east of Tounghoo.—Fl. Apr. May.

2. P. LEIOPHYLLA, Kurz in Journ. As. Soc. Beng. 1873, 73; Bth. in Linn. Trans. XXX. 361.

HAB. Frequent in the tropical forests of the Pegu Yomah, especially along its eastern slopes.—Fl. HS. ?; Fr. Febr. March.

### Acacia, Willd.

#### Conspectus of Species.

\* *Trees or erect shrubs, the branchlets armed only with paired diverging stipulary or infra-stipulary prickles.*

× Flowers in spikes.

+ Pod-valves chartaceous, transversely reticulate-veined, the sutures nerve-like or almost keeled.

Glaucous-green, glabrous; leaflets oblong-linear, blunt, 3—5 lin. long; flowers yellow, . . . . . *A. ferruginea*.

+ + Pod-valves coriaceous, the margins not or hardly prominent.

Spikes glabrous or pubescent, yellow; leaves glabrous or slightly pubescent; bark much cracked and rough, dark brown, . . . . . *A. Catechu*.

Spikes tomentose, white; leaves while young greyish pubescent; bark rather even and smooth, white, . . . . . *A. Suma*.

× × Flowers in globular heads, yellow.

+ Pods dry-coriaceous, flat, dehiscent.

Bark whitish; flower-heads arranged in ample terminal panicles, . . . . . *A. leucophloea*.

+ + Pod thick, torose, fleshy-coriaceous, indehiscent.



Glabrous or nearly so; leaves  $1\frac{1}{2}$ —3 in. long, leaflets 2—3 lin. long, .... *A. Farnesiana*.

\* \* Woody climbers, without stipulary spines, but the branchlets armed along their whole length with sharp recurved prickles. Flower-heads globular.

× Pods fleshy-coriaceous, often somewhat constricted between the seeds.

Leaflets in 10—20 pairs, up to  $\frac{1}{2}$  in. long; flower-heads small, yellowish, .... *A. rugata*.

× × Pods dry, chartaceous or thin coriaceous, flat.

O Ovary and pods pubescent.

Leaflets in 15—40 pairs, 3—6 lin. long; flower-heads small, white, in panicles,

... *A. caesia*.

O O Ovary and pods glabrous.

Leaflets in 8—20 pairs,  $\frac{1}{2}$  in. long; peduncles tawny tomentose, ..... *A. Intsia*.

Leaflets in 30—40 pairs, 2—3 lin. long; flower-heads the size of a large pea; panicles and young branchlets puberulous or tomentose, not pruinous, ..... *A. pennata*

As preceding, but branchlets and panicles pruinous; leaflets up to  $\frac{1}{2}$  in. long; flower-heads twice the size, ..... *A. pruinescens*.

1. *A. FERRUGINEA*, DC. II. 458; Bth. in Hook. Lond. Journ. Bot. I. 508. and in Linn. Trans. XXX. 518; WA. Prod. I. 273; Bedd. Fl. Sylv. t. 51.—(*Mimosa ferruginea*, Roxb. Fl. Ind. II. 561).

HAB. Burma (according to Beddome).

2. *A. CATECHU*, Willd. sp. pl. IV. 1079; Miq. Fl. Ind. Bat. I. 9; Bth. in Linn. Trans. XXX. 519. (*Mimosa Catechu*, L. f. Suppl. 495; Roxb. Fl. Ind. II. 563 and Corom. Pl. II. 40. t. 174).

Var.  $\alpha$ . *GENUINA* (*A. catechuoides*, Bth. in Hook. Lond. Journ. I. 510; *Mimosa catechuoides*, Roxb. Corom. Pl. II. t. 175 and Fl. Ind. II. 562), young parts all slightly appressed pubescent but soon glabrescent; full-grown leaves glabrous or the leaflets ciliate, the rachis slightly pubescent; spikes shorter and thicker, like the calyces more or less appressed pubescent; corolla about twice the length of the calyx.

Var.  $\beta$ . *SUNDRA* (*A. Sundra*, DC. Prod. II. 458; Bth. in Hook. Lond. Journ. I. 510; *Mimosa Sundra*, Roxb. Corom. Pl. III. t. 225 and Fl. Ind. II. 562; Bedd. Fl. Sylv. t. 50), all parts glabrous or the very young shoots slightly pubescent; full-grown leaves and rachis quite glabrous; spikes elongate and slender, quite glabrous; corolla glabrous, about  $\frac{1}{2}$  longer than the glabrous calyx.

HAB. Var.  $\alpha$ . common in the dry forests, rarely in the lower mixed and savannah forests of Ava and Prome, extending into the Irrawaddi zone of Pegu; var.  $\beta$ . apparently in Ava.—Fl. Begin of RS; Fr. CS.

3. *A. SUMA*, Buch. in Voigt Hort. Calc. 260; Brand. For. Fl. 187; Bth. in Linn. Trans. XXX. 519.—(*Mimosa Suma*, Roxb. Fl. Ind. II. 563; *A. Catechu*, Bth. in Hook. Lond.; Journ. Bot. I. 510, non Willd.; Bedd. Fl. Sylv. t. 49).

HAB. Ava?

4. *A. LEUCOPHLOEA*, Willd. sp. pl. IV. 1063; Bth. in Hook. Lond. Journ. Bot. I. 103 and in Linn. Proc. XXX. 513; Miq. Fl. Ind. Bat. I.





9; Brand. For. Fl. t. 27; Bedd. Fl. Sylv. t. 48 (*Mimosa leucophloea*, Roxb. Corom. Pl. II. 27. t. 150).

Var.  $\alpha$ . GENUINA, flower-heads the size of a pea, the stout peduncles, and also the pods, shortly tomentose; leaves slightly, the rachis more or less, pubescent.

Var.  $\beta$ . MICROCEPHALA (*A. microcephala*, Grah. in Wall. Cat. 5263), flower-heads half the size, the slender peduncles and the inflorescence puberulous; pods when fully ripe quite glabrous; leaves and their rachis glabrous.

HAB. Var.  $\alpha$ . Ava, along the Irrawaddi (Wall. Cat. 5262); var.  $\beta$ . not unfrequent in the dry forests of the Prome district, up to 1000 feet elevation.—Fr. March.

The two varieties here adopted are very likely different species.

\*5. *A. FARNESIANA*, Willd. sp. pl. IV. 1083; Bth. in Hook. Lond. Journ. Bot. I. 494 and in Linn. Trans. XXX. 502; Bedd. Fl. Sylv. t. 52. (*Vachellia Farnesiana*, WA. Prod. I. 272; Wight Icon. t. 300).

HAB. Frequently planted in villages all over Burma, more especially in Ava and Prome, where it is often found half-spontaneous.—Fl. Jan.

6. *A. RUGATA*, Ham. Wall. Cat. 5251; Bth. in Hook. Lond. Journ. Bot. I. 514; *Mimosa rugata*, Lamk. Dict. I. 20. (1786).

Var.  $\alpha$ . GENUINA, ovary villous; softer parts more pubescent.

Var.  $\beta$ . CONCINNA (*A. concinna*, DC. Prod. II. 464; Bth. in Hook. Lond. Journ. Bot. I. 514 and in Linn. Trans. XXX. 531; *Mimosa concinna*, Willd. sp. pl. (1805) IV. 1039; Roxb. Fl. Ind. II. 565), ovary glabrous or nearly so; all softer parts more glabrous.

HAB. Var.  $\beta$ . frequent in the tropical and moister upper mixed forests, all over Burma down to Tenasserim and the Andamans.—Fl. March, Apr.; Fr. CS.

7. *A. CÆSIA*, Willd. sp. pl. IV. 1090; WA. Prod. I. 278; Bth. in Hook. Lond. Journ. Bot. I. 515 and in Linn. Trans. XXX. 530 in part. (*Mimosa caesia*, L. sp. pl. 1507, non Roxb.; *Mimosa torta*, Roxb. Fl. Ind. II. 566).

Var.  $\alpha$ . GENUINA, leaflets only about 3 lin. long, more rigid, blun-tish with or without a mucro; branches terete.

Var.  $\beta$ . ELEGANS, leaflets about  $\frac{1}{2}$  in. long, bristly acute, less rigid; branches 5-angular, retorsely prickly along the corners.

HAB. Var.  $\beta$ . not unfrequent in the tropical forests of the eastern slopes of the Pegu Yomah and in Martaban.—Fr. CS.

8. *A. INTSIA*, Willd. sp. pl. IV. 1091; Bth. in Hook. Lond. Journ. Bot. I. 515; Miq. Fl. Ind. Bat. I. 11. (*Mimosa Intsia*, L. sp. pl. 1508; Roxb. Fl. Ind. II. 565; *A. oxyphylla*, Grah. in Wall. Cat. 5252; Bth. l. c. 514; *Mimosa caesia*, Roxb. Fl. Ind. II. 565?).



HAB. Chittagong Hills ; Ava, Khakyen Hills, east of Bhamo.

9. *A. PENNATA*, Willd. sp. pl. 1090 ; Bth. in Hook. Lond. Journ. I. 516, excl. syn. Roxb. and in Linn. Trans. XXX. 531 in part only ; Miq. Fl. Ind. Bat. I. 12.—(*Mimosa pennata*, L. sp. pl. 1507 ; Roxb. Fl. Ind. II. 565 ; *A. prensans*, Lowe in Bot. Mag. t. 3408).

Var.  $\alpha$ . *GENUINA*, panicles puberulous ; flower-heads the size of a large pea ; young branchlets shortly puberulous ; leaflets glabrous ; rachis glabrous or slightly pubescent ; pods linear-lanceolate, acuminate at both ends.

2. Var.  $\beta$ . *CANESCENS* (*A. canescens*, Grah. in (Wall. Cat. 5256), panicles and young branchlets tomentose ; leaflets ciliate ; rachis tomentose ; pods linear-oblong, rounded at both ends, smooth, pale-coloured.

HAB. Var.  $\alpha$ . common in all leaf-shedding forests, all over Burma and the adjacent provinces ; var.  $\beta$ . Ava.—Fr. CS.

The two varieties here adopted offer differences which are rather of specific value.

10. *A. PRUINESCENS*, Kurz MS.

HAB. Not unfrequent in the tropical forests of the southern Pegu Yomah ; also Ava, Khakyen Hills, east of Bhamo (J. Anderson).

This species has flower-heads twice the size of those of the preceding ; and the branchlets, inflorescence, and peduncles are more or less pruinous, with or without an admixture of tomentum. It is a powerful climber, with somewhat compressed dark-coloured stems up to 3 feet girth. The tough reddish bark and fibre are used for poisoning fish.

### *Albizzia*, Durazz.

#### *Conspectus of Species.*

*Subg. 1. Eu-Albizzia.* Pods straight very flat, the sutures slightly thickened. Flowers white.

\* *Pinnæ numerous* (10—18) ; *leaflets linear*, 1—6 lin. long, in very numerous pairs.

× *Leaflets bluntish*, the nerve central or nearly so.

*Leaflets very narrow*, glabrous ; flower-heads small, in terminal panicles,

... *A. myriophylla*.

× × *Leaflets more or less acute*, the nerve marginal or nearly so. Trees.

*Stipules very large*, obliquely ovate, acuminate ; all parts more or less shortly pubescent ; corolla nearly 4 times as long as the calyx, ..... *A. stipulata*.

*Stipules none or obsolete* ; full-grown parts glabrous or nearly so, ..... *A. elegans*.

\* \* *Pinnæ in 2—6 pairs* ; *leaflets ovate to oblong*,  $\frac{1}{2}$ —1 $\frac{1}{2}$  in. long, in several pairs.

× *Leaflets sessile*.

*Flowers small* ; calyx minute ; corolla 1 $\frac{1}{2}$  lin. long ; pods blackish or brownish black,

... *A. odoratissima*.





Flowers rather conspicuous ; calyx  $1\frac{1}{2}$  lin. long ; corolla 4 lin. long ; pods yellowish,

.. *A. Lebbek*.

× × Leaflets shortly petioluled. Pinnæ in 4—3 pairs.

Leaflets blunt or somewhat acute,  $\frac{1}{2}$ —1 in. long, glaucescent beneath ; pods tapering at the base, linear, smooth, brown, ..... *A. proceræ*.

Leaflets very like those of *Cassia Fistula*, usually emarginate-bluntish,  $2\frac{1}{2}$ —4 in. long ; pods stalked, oblong, veined, black, ..... *A. Teymanni*.

\* \* \* Pinnæ in a single pair ; leaflets few only, large, acuminate.

Glabrous ; pods broad, very flat, ..... *A. lucida*.

*Subg. 2. Pithecolobium*, Mart. Pods twisted circinately or screw-like or curved. Flowers white.

\* *Flowers pedicelled, in head-like umbels or racemes. Trees.*

+ Branchlets terete.

Leaves with a single pair of pinnæ ; leaflets in 2—3 pairs, smooth and glossy ; seed-bearing lobes of pod about an inch long and broad, ..... *A. Jiringa*.

+ + Branchlets sharply angular.

Leaves with about 12 pairs of pinnæ ; leaflets in 4—8 pairs, while young shortly and softly pubescent like all younger parts, acuminate, ..... *A. heterophylla*.

\* \* *Flowers sessile, in small heads.*

Erect shrub ; leaves with a single pair of pinnæ ; leaflets in 4—8 pairs, almost glabrous, glaucous beneath, ..... *A. glomeriflora*.

1. *A. MYRIOPHYLLA*, Bth. in Hook. Lond. Journ. Bot. III. 90 and in Linn. Trans. XXX. 567.—(*Mimosa microphylla*, Roxb. Fl. Ind. II. 549, non Willd.).

HAB. Tenasserim (Falconer).—Fl. Apr.

2. *A. STIPULATA*, Boiv. Encycl. XIX. siècl. II. 33 ; Bth. in Hook. Lond. Journ. Bot. III. 92 and in Linn. Trans. XXX. 568 ; Miq. Fl. Ind. Bat. I. 28 ; Bedd. Fl. Sylv. t. 55.—(*Mimosa stipulata*, Roxb. Hort. Beng. 40 ; *Mimosa stipulacea*, Roxb. Fl. Ind. II. 549 ; *Mimosa Smithiana*, Roxb. l. c. 550).

HAB. Frequent in the tropical and moister upper mixed forests, ascending into the hill-forests up to 4000 feet elevation, from Chittagong and Ava down to Tenasserim and the Andamans.—Fl. Apr. May ; Fr. CS.

3. *A. ELEGANS*, Kurz in Pegu Rep. App. B. 47.

HAB. Not unfrequent in the tropical forests of the eastern slopes of the Pegu Yomah, especially along the feeders of the Swa choung, etc.

Very similar to the preceding, but a much more elegant tree ; flowers and fruits unknown. I have the very same plant from the island of Banka (Sumatra).

4. *A. ODORATISSIMA*, Bth. in Hook. Lond. Journ. Bot. III. 88 and in Linn. Trans. XXX. 565. ; Bedd. Fl. Sylv. t. 54.—(*Mimosa odoratissima*, Roxb. Corom. Pl. II. 12. t. 120 and Fl. Ind. II. 546 ; *A. micrantha*, Boiv. Encycl. XIX. siècl. II. 33 ; Miq. Fl. Ind. Bat. I. 24).

HAB. Frequent in the mixed and dry forests, all over Prome, Pegu, and Martaban down to Tenasserim.—Fl. HS. ; Fr. CS.





5. *A. LEBBEK*, Bth. in Hook. Lond. Journ. Bot. III. 87 and in Linn. Trans. XXX. 562; Bedd. Fl. Sylv. t. 53 ?—(*Mimosa Lebbek*, L. sp. pl. 1503; *Mimosa Sirissa*, Roxb. Fl. Ind. II. 544; *A. latifolia*, Boiv. Encycl. XIX. siècl. II. 33; Miq. Fl. Ind. Bat. I. 22; *Mimosa speciosa*, Jacq. Icon. rar. I, 19. t. 198).

HAB. Frequent in the tropical and moister upper mixed forests, from Pegu and Martaban down to Tenasserim and the Andamans; a pubescent variety rare along choungs in the Prome district.—Fl. Apr. May; Fr. CS.

6. *A. PROCERA*, Bth. in Hook. Lond. Journ. Bot. III. 89 and in Linn. Trans. XXX. 564; Miq. Fl. Ind. Bat. I. 21; Brand. For. Fl. t. 26. (*Mimosa procera*, Roxb. Corom. Pl. II. 12. t. 121 and Fl. Ind. II. 548; *Mimosa elata*, Roxb. Fl. Ind. II. 546).

HAB. Frequent in the mixed and the dry forests, entering also the tidal savannahs, all over Prome, Pegu, and Martaban down to Tenasserim.—Fl. May, June; Fr. CS.

7. *A. TEYSMANNI*, Kurz MS.

HAB. Adjoining Siamese province of Radbooree.—Fr. HS. (ton-sak of the Siamese).

8. *A. LUCIDA*, Bth. in Hook. Lond. Journ. Bot. III. 86 and in Linn. Trans. XXX. 560; Miq. Fl. Ind. Bat. I. 18.—(*Mimosa lucida*, Roxb. Fl. Ind. II. 544).

HAB. Common in the dry forests of Ava and Prome; rather rare in the lower mixed forests of Pegu.—Fl. Apr.; Fr. CS.

9. *A. JIRINGA* (*Mimosa Jiringa*, Jack. in Mal. Misc. I. 14; *Mimosa Djiringa* and *Kæringa*, Roxb. Hort. Beng. 40; and Fl. Ind. II. 543; *Pithecolobium lobatum*, Bth. in Hook. Lond. Journ. Bot. III. 208 and in Linn. Trans. XXX. 575; Miq. Fl. Ind. Bat. I. 33).

HAB. Rather frequent in the tropical forests, and along choungs in the moister upper mixed forests, of the Pegu Yomah; and from Martaban down to Tenasserim; also much planted in villages.—Fl. Apr. May; Fr. March. Apr.

10. *A. HETEROPHYLLA* (*Mimosa heterophylla*, Roxb. Fl. Ind. II. 545; *Pithecolobium angulatum*, Bth. in Hook. Lond. Journ. Bot. III. 208 and in Linn. Trans. XXX. 580; Miq. Fl. Ind. Bat. I. 34; *Pithecolobium acutangulum*, Miq. Suppl. Fl. Sumatr. 282).

HAB. Frequent in the drier hill-forests, also in the pine-forests, from the Martaban Hills down to Tenasserim, at 4000 to 6000 feet elevation.—Fl. March, Apr.; Fr. Apr. May.

11. *A. GLOMERIFLORA*, Kurz in Journ. As. Soc. Beng. 1873, 74; Bth. in Linn. Trans. XXX. 560.

HAB. Not unfrequent in the drier hill-forests of the Martaban Hills, east of Tonngahoo, at 4000 to 7000 feet elevation.—Fl. March.



**Inga**, Willd.

\*1. *I. DULCIS*, Willd. sp. pl. IV. 1005; Wight. Icon. t. 198. (*Mimosa dulcis*, Roxb. Corom. Pl. I. 67. t. 99 and Fl. Ind. II. 556; *Pithecolobium dulce*, Bth. in Hook. Lond. Journ. Bot. III. 199 and in Linn. Trans. XXX. 572; Miq. Fl. Ind. Bat. I. 40, Bedd. Fl. Sylv. t. 188; *Albizzia dulcis*, F. Muell.).

HAB. Only planted in the larger stations where Europeans reside.—Fl. CS.; Fr. HS.

**ROSACEÆ.***Conspectus of Genera.*

A. Carpels solitary or united into a solid 2- or more-celled ovary. Fruit indehiscent.

\* *Ovary superior. Fruit a drupe. Calyx or its lobes usually deciduous.*

*Trib. 1. Chrysobalanæ.* Flowers usually irregular. Style basilar. Ovules 2, ascending. Radicle inferior.

PARINARIUM.—Petals 5 or 4. Stamens perigynous; filaments filiform; anthers small. Ovary and drupe 2-celled.

*Trib. 2. Prunæ.* Flowers regular. Style almost terminal. Ovules 2, suspended. Radicle superior.

PRUNUS.—Calyx 5-lobed. Petals 5, usually conspicuous. Drupe with a bony putamen, straight.

PYGEUM.—Calyx 5—15-toothed. Petals 5—10, minute or none. Drupe often transversely didymous, coriaceous.

\* \* *Ovary inferior. Fruit an apple or a 1—5-pyrenous drupe.*

*Trib. 3. Pomæ.\**—Ovary-cells 1—5, with 2 ovules in each cell. Leaves simple to lobed and pinnate. Flowers regular.

PIRUS.—Calyx-limb deciduous or persistent. Ovary and apple 2—5-celled, the endocarp often cartilaginous. Leaf-shedding trees or shrubs.

ERIOBOTRYA.—Calyx-limb persistent. Ovary and berry 1—5-celled, the endocarp and septa thin. Evergreen trees.

B. Carpels usually numerous, rarely few, connate or more usually distinct and inserted on a torus or enclosed in the calyx-tube. Fruit-carpels indehiscent, or rarely dehiscent (in *Spireæ*, etc.)

\* *Carpels distinct, within the persistent calyx-tube, which forms a compound spuriously inferior fruit.*

*Trib. 4. Rosacæ.*—Calyx without bractlets. Petals usually 5. Carpels many, 1-ovuled. Achenes dry, enclosed in the fleshy calyx-tube.

ROSA.—Shrubs, often prickly, with unpaired pinnate leaves and showy flowers.

\* \* *Carpels distinct, on a conspicuous torus, when ripe forming a superior compound dry or sappy fruit.*

*Trib. 5. Rubæ.*—Stamens and carpels numerous. Ovules 2, suspended. Calyx without bractlets.—Shrubs or undershrubs, often prickly, with compound, rarely simple, leaves.

\* Decaisne's treatise on this group has not yet reached me.





RUBUS.—Characters of the Tribe.

*Trib. 6. Potentilleæ.*—Stamens and carpels 4 or more, the latter with a solitary ovule; style usually ventral, marcescent or caducous. Calyx usually with bractlets. Unarmed herbs or undershrubs, with compound or simple leaves.

FRAGARIA.—Calyx with 5 bractlets. Stamens numerous. Ripe carpels crustaceous, seated on a fleshy sappy torus; styles ventral. Herbs with 3-foliolate leaves.

POTENTILLA.—Calyx with 4 or 5 bractlets; torus in fruit dry, rest as in preceding. Herbs or undershrubs with variously compound leaves.

### Parinarium, Juss.

1. P. SUMATRANUM, Bth. in Fl. Nigrit. 334; Miq. Fl. Ind. Bat. I. 1. 353.—(*Pterocarya Sumatrana*, W. Jack in Maccl. Calc. Journ. IV. 165).

HAB. Burma, without locality, probably Upper Tenasserim (Brandis); frequent in the adjoining provinces of Siam, where the fruit is called 'makloke.'

### Prunus, L.

#### Conspectus of Species.

\* *Leaf-shedding trees or shrubs. Flowers appearing before or along with the young foliage. Vernation of leaves conduplicate or convolute.*

*Subg. 1. Amygdalus, L.*—(*Armeniaca*, Juss.) Flowers solitary or clustered. Drupes densely velvety or tomentose.

Leaves narrow, 2-glandular at the base; stone wrinkled, ..... *P. Persica*.

*Subg. 2. Prunus.*—Flowers solitary, fascicled or racemose. Drupes glabrous.

\* *Drupes usually pruinous. Vernation of leaves convolute.*

Glabrous; flowers rather small, usually by threes; petals  $\frac{1}{2}$  in. long; calyx-tube 1—1 $\frac{1}{2}$  lin. long, lobes usually somewhat longer, ..... *P. triflora*.

Almost glabrous; flowers rather large, by 2 or 3 from bracted buds; petals nearly  $\frac{1}{2}$  in. long; calyx-tube 3 $\frac{1}{2}$  lin. long, the lobes nearly as long, ..... *P. Puddum*.

\* \* *Drupes smooth, not pruinous. Vernation of leaves conduplicate.* (*Cerasus*, Juss).

\* \* *Evergreen trees. Flowers racemose.* (*Pygeopsis*).

Drupes an in. long; lateral nerves very faint or almost obsolete, ..... *P. Martabanica*.

Drupes  $\frac{1}{2}$  in. long; lateral nerves thin but prominent, anastomosing along the margins, ..... *P. Javanica*.

\*1. P. PERSICA, Brand. For. Fl. 191. (*Persica vulgaris*, Mill. Dict. No. 1; DC. Prod. II. 531; Spach Suit. t. 5; Boiss. Fl. Orient. II. 640; *Amygdalus Persica*, L. sp. pl. 677; Heyne Arznei Gew. IV. t. 38; Bot. Reg. t. 1586; Journ. Hort. Soc. Lond. III. t. 313; Houtte Fl. d. serr. X. t. 969. XIII. t. 1299. 1300 and 1319; Roxb. Fl. Ind. II. 500).

HAB. Much cultivated in Ava, as for example in the Khakyen Hills and about Bhamo.—Fl. Febr. March; Fr. June, July.

2. P. TRIFLORA, Roxb. Hort. Beng. 38 and Fl. Ind. II. 501, "trifolia" errore typogr.—(*Cerasus triflora*. Lindl. in Wall. Cat. 720).



HAB. Ava, Khakhyen Hills (J. Anderson).—Fl. Octob., Nov.

NB. There is a leaf-specimen of another *Prunus* from the Khakhyen hills in HBC. which differs from *P. pseudo-cerasus*, Ldl., only very slightly in the smaller size and in the serrature of its leaves.

3. *P. PUDDUM*, Roxb. ap. Voigt Cat. Hort. Calc. 200 (*Cerasus Puddum*, Wall. Pl. As. rar. II. t. 146; DC. Prod. II. 537; *P. sylvatica*, Roxb. Fl. Ind. II. 501).

HAB. Ava, Khakhyen Hills.

4. *P. MARTABANICA*, Kurz in And. Rep. ed. 2. 37. (*Cerasus Martabanica*, Wall. Cat. 4902).

HAB. Rather frequent in the tropical forests of the Andamans; Tenasserim.—Fr. May.

### Pygeum, Gærtn.

#### Conspectus of Species.

- *Ovary tawny villous.*

Leaves beneath more or less tawny villous, ..... *P. arboreum*.

- • *Ovary glabrous or sparingly hirsute.*

Glabrous; nerves and veins conspicuous and deeply immersed so as to render the surface of the leaves almost wrinkled, ..... *P. acuminatum*.

Young branchlets, petioles, and nerves beneath pubescent; nerves and veins thin, little visible, ..... *P. persimile*.

1. *P. ARBOREUM*, Endl. Gen. plant. 1250 in part. (*P. parviflorum*, T. and B. in Nat. Tydsch. Neerl. Ind. II. 309; Miq. Fl. Ind. Bat. I/1, 361; *Polydontia arborea*, Bl. Bydr. 1105 in part).

HAB. Tenasserim (Helfer 2053); Taipo mountains, at 4000 feet elevation (Dr. Brandis).

2. *P. ACUMINATUM*, Colebr. in Trans. Linn. Soc. XII. 360. t. 18, non Wight Icon.; Miq. Fl. Ind. Bat. I/1. 162).

HAB. Chittagong (Hf. and T. Th.).

3. *P. PERSIMILE*, Kurz in Journ. As. Soc. Beng. 1872, 306.

HAB. Tenasserim (Helfer 2056).

Allied to *P. latifolium*; general appearance exactly that of *P. Lampongum*, Miq.

The genus *Pygeum* is so closely allied to the section *Pygeopsis* of *Prunus* with evergreen foliage as to make it difficult to keep it distinct. Indeed, *Pygeum* and *Pygeopsis*, combined, stand pretty much in the same relation to *Prunus* as *Eriobotrya* does to *Pirus*.

### Pirus, L.

#### Conspectus of Species.

- *Flowers usually by pairs from the axils of the leaves, or spuriously racemose from the non-developement of young foliage. Ovary-cells many-ovuled. (Cydonia, Tourn.)*





Young parts, pedicels, and calyx densely white-woolly; petals an inch long; fruits pear-shaped, 1—1½ in. long, crowned by the calyx-limb, ..... *P. Indica*.

\* \* Flowers corymbose or panicled at the end of the branchlets or in the axils of the upper leaves. Ovary-cells 2-ovuled.

Flowers corymbose, on slender pedicels 1—2 in. long; fruits globose, the size of a bullet, ..... *P. Pashia*.

Flowers panicled, very shortly and stoutly pedicelled; fruits as in preceding, ..... *P. granulosa*.

1. *P. INDICA*, Roxb. Fl. Ind. II. 511; Wall. Pl. As. rar. II. t. 173. (*Cydonia Indica*, Spach Hist. nat. veg. II. 158; Wenzig in Linnæa 1874. 12).

HAB. Ava. Taong dong (Wall).; Pensee, Khakhyen Hills (J. Anderson).—Fl. March; Fr. Sept.

2. *P. PASHIA*, Don. Fl. Nep. 236; Wenzig in Linn. 1874. 48. (*P. variolosa*, Wall. Cat. 680; G. Don. Dichlam. Pl. II. 622).

HAB. Ava, Khakhyen Hills, east of Bhamo (J. Anderson).—Fl. March; Fr. Aug.

3. *P. GRANULOSA*, Bertol. in. Mem. d'Accad. d. sc. d. istit. d. Bologna Ser. 2. IV. 10. t. 3. sub nom. *P. granulata*.—(*P. Karensium*, Kurz in Journ. As. Soc. Beng. 1872. 306).

HAB. Not unfrequent in the drier hill-forests, especially the stunted ones, of the Martaban Hills, east of Tounghoo, at about 7000 feet elevation. Fr. March. Apr.

### **Eriobotrya, Ldl.**

(*Photinia*, Ldl.)

#### *Conspectus of Species.*

\* Leaves entire.

Calyx and panicle puberulous; berries the size of a pea, ..... *E. integrifolia*.

Quite glabrous; fruit an apple of the size of a bullet, ..... *E. macrocarpa*.

\* \* Leaves coarsely crenate, at least towards the apex; inflorescence rusty or tawny woolly-tomentose.

Leaves glabrous; calyx about a line long, ..... *E. dubia*.

Leaves woolly-tomentose beneath; calyx 3—4 lin. long, ..... *E. Japonica*.

1. *E. INTEGRIFOLIA* (*Photinia integrifolia*, Ldl. in Trans. Linn. Soc. XIII. 103; Bot. Reg. t. 1956; DC. Prod. II. 631; Wenzig in Linn. 1874. 88; *Photinia Notoniana*, WA. Prod. I. 302; Wight Icon. t. 991 and Spicil. Neilgh. t. 64, Illustr. Ind. pl. t. 86; Bedd. Fl. Sylv. t. 192.; *Photinia eugenifolia*, Lindl. Bot. Reg. t. 1956).

HAB. Frequent in the stunted forests of the Nattoung mountains in Martaban, east of Tounghoo, at an elevation above 7000 feet.—Fr. March, Apr.

2. *E. MACROCARPA*, Kurz in Journ. As. Soc. Beng. 1872. 306.



HAB. Rare in the tropical forests on the Kambala toung of the Pegu Yomah, at about 2000 feet elevation.—Fr. March, Apr.

The fruits look more like apples, but the tree is evergreen. The very same tree occurs also in the outer hills of the Sikkim Himalaya.

3. *E. DUBIA* (*Photinia dubia*, Lindl. in Trans. Linn. Soc. XIII. 104. t. 10; DC. Prod. II. 631; Wenzig in Linn. 1874. 94; *Mespilus Bengalen-sis*, Roxb. Fl. Ind. II. 510; *Photinia Bengalensis*, Wall. ap. Voigt Hort. Calc. 198 excl. syn. Ldl.).

HAB. Frequent in the damp hill-forests of the Martaban Hills, east of Tounghoo, at 6000 to 7000 feet elevation; Ava Hills, east of Bhamo (J. Anderson); Chittagong (Roxb.).—Fl. March.

\*4. *E. JAPONICA*, Lindl. in Trans. Linn. Soc. XIII. 103; WA. Prod. I. 302; Wight Icon. t. 226; Sieb. and Zucc. Fl. Jap. I. 182. t. 97; Wenzig in Linn. 1874. 97.—(*Mespilus Japonica* Thbg. Fl. Jap. 205; Vent. Jard. Malm. I. t. 19; Bot. Reg. t. 365; Roxb. Fl. Ind. II. 510).

HAB. The 'loquat' is but rarely cultivated in the larger towns of Pegu, such as Rangoon.

## Rosa, L.

### Conspectus of Species.

*Sect. 1. Systylæ.* Styles connate into a column. Flowers in corymbs.

Flowers small, pink; calyx glabrous or pubescent, the lobes short and entire; leaflets small, pubescent beneath; stipules pinnatifid, ..... *R. multiflora*.

Flowers large, white; calyx glandular-tomentose, one or more of the lobes usually lobed; leaflets glabrous; stipules entire, ..... *R. moschata*.

*Sect. 2. Eleuterostylæ.*—Styles all free.

\* *Calyx-throat pervious and not closed by the disk.*

Flowers large, usually corymbose; calyx glabrous or sparingly glandular; leaflets glabrous, glaucous beneath; carpels about 40 to 50, ..... *R. Indica*.

As preceding, but leaves solitary; carpels about 15, ..... *R. damascena*.

Leaflets small; flowers solitary; calyx-tube and the globular fruits densely echinate, ..... *R. microphylla*.

\* \* *Calyx-throat completely closed by the disk.*

Calyx, younger branchlets, and the globular fruits densely tomentose; flowers white, ..... *R. involucrata*.

Leaflets wrinkled, opaque; calyx and peduncles hispid, ..... *R. rubiginosa*.

1. *R. INVOLUCRATA*, Roxb. ap. Lindl. Monogr. Ros. 8; Roxb. Fl. Ind. II. 513; DC. Prod. II. 602; Bot. Reg. t. 739; Wight Icon. t. 234.

HAB. Ava, Irrawaddi plains from Mandalay northwards, in savan-nahs.—Fl. Jan. Febr.

NB. Several species of roses (especially *R. Indica* and *R. damascena*) are found planted, around khyoungs chiefly, in almost every one of the larger villages of Pegu.



# Rubus, L.

## Conspectus of Species.

- \* *Carpels few, only 3—6. Leaves simple.*

*Petioles very short; flowers in large terminal panicles, ..... R. pyrifolius.*

- \* \* *Carpels numerous, forming a sort of sappy berry.*

× *Leaves entire or lobed.*

+ *All softer parts and the underside of the lobed leaves covered with a dense tomentum usually intermixed with longer hairs. Calyx-lobes entire.*

*Bracts and stipules entire or subulate-toothed, sometimes very deeply so and in this case the lobes short, ..... R. rugosus.*

*Bracts and stipules pinnately cut, the segments long, thin, and often filiform, ... R. Moluccanus.*

+ + *All parts, except the inflorescence, without tomentum, rather glabrous or pubescent.*

*Calyx-lobes pectinate-toothed, ..... R. ferox.*

× × *Leaves digitately 3—5-foliolate.*

*Branchlets almost terete; leaflets green, shortly puberulous; stipules and bracts linear, entire, shortly glandular-pubescent; flowers white, ..... R. pentagonus.*

*Branchlets terete; leaflets glabrous or pubescent; stipules and bracts usually cut into 1—2 linear segments, glabrous or only very sparingly and shortly glandular-hairy; flowers red, ..... R. alpestris.*

× × × *Leaves pinnately 3-foliolate or unpaired-pinnate.*

O *Fruits tomentose.*

*Leaves unpaired pinnate, the leaflets beneath white or yellowish tomentose; flowers white, ..... R. lasiocarpus.*

O O *Fruits glabrous.*

*Leaves pinnately 3-foliolate, the leaflets white or yellowish tomentose beneath; petals white, ..... R. flavus.*

*Leaves unpaired-pinnate, uniformly green; petals white, ..... R. roseaefolius.*

1. *R. PYRIFOLIUS*, Sm. Icon. Ined. fasc. III. 61; DC. Prod. II. 567; Miq. Fl. Ind. Bat I/1. 384. (*R. hexagynus*, Roxb. Fl. Ind. II. 516; WA. Prod. I. 299; *R. Indicus*, Lesch. in DC. Prod. II. 568).

HAB. Hills of Ava.—Fl. March.

2. *R. MOLUCCANUS*, L. sp. pl. 707; DC. Prod. II. 566; Miq. Fl. Ind. I/1. 382; Bth. Fl. Austr. II. 439.—(*R. Moluccus latifolius*, Rumph. Herb. Amb. V. 78. t. 47. f. 2.)

VAR. α. *GENUINUS*, leaves beneath clothed with a short tomentum intermixed with a few longer hairs only, the basal lobes usually diverging; calyx velvety and at the same time densely tawny and appressedly hirsute, the lobes acuminate.

Var. β. *ALCEÆFOLIUS* (*R. alceæfolius*, Poir. Encycl. Suppl. VI. 247; DC. Prod. II. 567; Miq. Fl. Ind. Bat. I/1 379), leaves softly pubescent beneath, the basal lobes usually much converging; calyx densely tawny or yellowish appressed hirsute, the lobes acuminate.





? Var.  $\gamma$ . ABNORMALIS, stems covered with spreading tawny hairs; leaves of var.  $\alpha$ .; calyx shortly and densely greyish or whitish tomentose without any admixture of longer hairs, the lobes acute or almost blunt.

HAB. Var.  $\alpha$ ., often passing into  $\beta$ ., frequent on the Martaban Hills, as well in the drier hill-forests as in hill-toungyas and deserted cultivated lands, from 2500 to 7000 feet elevation; var.  $\gamma$ . Burma probably Ava (Griff. 2147).—Fl. Febr. March.

3. *R. FEROX*, Wall. Cat. 724; Focke in Abhandl. Nat. Ver. Bremen IV. 196. (*R. Moluccanus*, Roxb. Fl. Ind. II. 518 et ejusd. Icon. MS. IX. t. 32. f. 1853).

HAB. Burma, probably Ava (Griff. 2145).

4. *R. PENTAGONUS*, Wall. Cat. 731; Focke in Abh. Nat. Ver. Brem. IV. 192).

HAB. Not uncommon in the damp hill-forests along hill-streams, on the Nattoung mountain, east of Tounghoo, at 6000—7000 feet elevation.—Fl. March.

I formerly combined *R. alpestris* and this species, but Mr. O. Kuntze of Leipzig, who revised the species of *Rubus* in HBC., has pointed out to me the differences between the two.

5. *R. LASIOCARPUS*, Sm. in Rees. Cycl. XXX. ; DC. Prod. II. 558; WA. Prod. I. 699; Wight Icon. t. 232. (*R. albescens* and *R. racemosus*, Roxb. Fl. Ind. II. 519; *R. Mysorensis*, Heyne in Roth Nov. sp. 235; DC. l. c. 557; *R. Horsfieldii*, Miq. Fl. Ind. Bat. I/1. 375. t. 7).

HAB. Ava, hills east of Bhamo (J. Anderson); Karenee country (O'Riley).

6. *R. FLAVUS*, Ham. ap. Don. Prod. Nep. 234; DC. Prod. II. 559.—(*R. Gowreepful*, Roxb. Fl. Ind. II. 517; WA. Prod. I. 298; Wight Icon. t. 231).

HAB. Hills of Ava, Taong dong (Wall.) ; Kakhyen Hills (J. Anderson); Martaban Hills, east of Tounghoo (Rev. F. Mason).—Fl. Febr. March.

7. *R. ROSEFOLIUS*, Sm. Icon. in ed. III. 60. t. 60; DC. Prod. II. 556; Miq. Fl. Ind. Bat. I/1. 375; Bot. Mag. t. 1783 c. fl. plen.; Hook. Icon. Pl. t. 349; Lodd. Bot. Cab. t. 158; Bth. Fl. Austr. II. 431. (*R. rosaeiflorus*, Roxb. Fl. Ind. II. 519).

Var.  $\alpha$ . ASPER (*R. asper*, Don. Prod. Nep. 234), stem, branches, and petioles more prickly and covered with long stiff blackish gland-hairs; calyx and peduncle tomentose-pubescent, with long spreading gland-bristles; leaves more or less appressed hairy; flowers usually in poor corymbs.

Var.  $\beta$ . GLABRIUSCULUS, stems, branches, and petioles glabrous or with few short gland-hairs only; peduncles and pedicels usually shortly glandular-pubescent, rarely almost glabrous; calyx glabrous or sprinkled





with few short gland-hairs, velvety-tomentose inside; leaves more glabrous; flowers much larger, usually solitary on leaf-opposed long pedicels.

HAB. Var.  $\alpha$ . Rather frequent in the hill-forests of Martaban, at 3000—4000 feet elevation, freely springing up in hill-toungyas; var.  $\beta$ . Ava Hills, especially those east of Bhamo.—Fl. Apr.

The above two forms are probably better treated as separate species, The branches are more or less terete or angular.

### **Fragaria, L.**

1. F. INDICA, Andr. Bot. Rep. t. 475; Bot. Reg. t. 61; DC. Prod. II. 571; WA. Prod. I. 300; Wight Icon. t. 989. (*Fragaria Malayana*, Roxb. Fl. Ind. II. 520; *Duchesnea fragarioides*, Sm. in Trans. Linn. Soc. X. 373; Miq. Fl. Ind. Bat. I. 372).

HAB. Ava, Bhamo and Tapeng valley (J. Anderson); Chittagong, Comilla (C. B. Clarke).—Fl. Fr. Febr. March.

### **Potentilla, L.**

1. P. KLEINIANA, WA. Prod. I. 300; Wight Ill. t. 85. (*Duchesnea Sundaica*, Miq. Fl. Ind. Bat. I/2. 372. t. 6).

HAB. Ava, Khakyen Hills, Ponsee (J. Anderson).—Fl. Fr. March.

## **SAXIFRAGEÆ.**

### *Conspectus of Genera.*

*Trib. 1. Saxifrageæ.*—Herbs, often scapigerous. Leaves alternate. Stipules none. Flowers 5-merous. Ovary 1—3-celled.

ASTILBE.—Petals 5 or none. Stamens 8 or 10. Carpels nearly free. Herbs with ternatisect leaves. Flowers panicled.

*Trib. 2. Hydrangeæ.*—Trees or shrubs. Leaves opposite. Stipules none. Petals often valvate. Stamens usually epigynous. Ovary usually 3—5-celled.

DICHROA.—Petals 5 or 6, valvate. Styles 3—5, club-shaped. Fruit a berry.

*Trib. 3. Escalloniæ.*—Trees or shrubs. Leaves alternate. Stipules none. Stamens usually as many as petals.

ITEA.—Ovary half-superior, 2-celled. Style separable into two. Capsule superior, 2-beaked.

POLYOSMA.—Ovary inferior, 1-celled. Style simple. Fruit a 1-seeded berry.

### **Polyosma, Bl.**

1. P. WALLICHII, Benn. Pl. Jav. rar. 196; Hf. and Th. in Linn. Proc. II. 77.

HAB. Tropical forests of the Andamans, not rare.—Fl. RS.

Very near to *P. ilicifolia*, Bl., but the flowers are smaller and the fruits different.





## CRASSULACEÆ.

## Conspectus of Genera.

BRYOPHYLLUM.—Calyx large, inflated, shortly 4-cleft.

KALANCHOE.—Calyx 4-parted.

## Bryophyllum, Salisb.

1. *B. PINNATUM* (*Kalanchoe pinnata*, Pers. Ench. I. 446; Miq. Fl. Ind. Bat. I/1. 728; *B. calycinum*, Salisb. Parad. Lond. t. 3; DC. Prod. III. 396; WA. Prod. I. 360; Wight. Ill. Ind. Bot. Suppl. 55. t. 31; Bot. Mag. t. 1409; *Cotyledon pinnata*, Lam. Encycl. Meth. II. 141 (1786); *Cotyledon rhizophylla*, Roxb. Fl. Ind. II. 456; *Colydedon calycina*, Roth Nov. sp. 217).

HAB. Frequent in rubbishy or waste places, ruins, etc., chiefly around villages, all over Burma and the adjacent provinces. Fl. Jan. Febr.

## Kalanchoe, Adans.

## Conspectus of Species.

× Panicles glandular-puberulous.

Leaves pinnatifid, the lobes flattened, lobed or cut, ..... *K. laciniata*.

× × Panicles quite glabrous.

Leaves simple or pinnately 3-foliolate, crenate, ..... *K. acutiflora*.

Leaves pedately 3-pinnatisect, the segments almost terete, sulcate, ..... *K. teretifolia*.

1. *K. LACINIATA*, DC. Pl. grass. t. 100 and Prod. III. 395; WA. Prod. I. 360; Wight Icon. t. 1158.—(*Cotyledon laciniata*, L. sp. pl. 615; Roxb. Fl. Ind. II. 456).

HAB. Ava, Irrawaddi valley (J. Anderson).

2. *K. ACUTIFLORA*, Haw. Syn. 109; Bot. Rep. t. 560; Miq. Fl. Ind. Bat. I. 728. (*K. varians*, Wall. Pl. As. Soc. rar. II. 53. t. 167 sub. nom. *K. subamplectens*, non Haw.; Hf. and Thoms. in Linn. Proceed. II. 91, quoad specim. Birmanica).

HAB. Not unfrequent in uncultivated places along the Irrawaddi in Ava.—Fl. Jan.

3. *K. TERETIFOLIA*, Haw. in Wall. Pl. As. rar. II. 53. t. 166; Hf. and Th. in Linn. Proc. II. 91.

HAB. Pegu, near Rangoon? (*teste* Wallich); Ava, Taong dong (Wall.).—Fl. Jan.

## DROSERACEÆ.

## Conspectus of Genera.

DROSERA.—Stamens 4—8. Styles 2—5, simple, 2-parted, or many-cleft. Ovary 1-celled. Glandular-pilose herbs, scapiferous or not.

ALDROVANDA.—Stamens 5. Styles 5, filiform. Ovary 1-celled. Glabrous, floating herbs with whorled leaves.

## Drosera, L.

## Conspectus of Species.

× Leaves radical or nearly so, rosulate. Scapes leafless.

Leaves obovate-spathulate; flowers white or pale rose, ..... *D. Burmanni*.





× × Leaves scattered. Scapes leafy.

Leaves linear ; flowers purple, ..... *D. Indica*.  
Leaves peltate, half-orbicular or crescent-shaped ; flowers white, ..... *D. peltata*.

1. *D. BURMANNI*, Vhl. Symb. III. 50 ; Wight Ill. t. 20, excl. stigma ; Wight Icon. t. 944 ; Planch. in Ann. d. sc. nat. ser. 3. IX. 190 ; Hf. and Th. in Linn. Proc. II. 82.

HAB. Chittagong (Hf. and Th.) ; very rare in grass-lands in the eng-forests of the Prome district.—Fl. March.

2. *D. INDICA*, L. Fl. Zeyl. 51 ; Wight Ill. t. 20 ; Planch. in Ann. d. sc. nat. 3 ser. IX. 204 ; Hf. and Th. in Linn. Proc. II. 82.

HAB. Not unfrequent in wet short-grassed pastures and swamps of of the diluvial lands of Southern Pegu, chiefly about Rangoon, etc. ; Tenasserim, Tavoy (Wall).—Fl. Aug.—Decemb.

3. *D. PELTATA*, Sm. Exot. Bot. I. 79. t. 41 ; Planch. in Ann. d. sc. nat. 3 ser. IX. 296 ; DC. Prod. I. 319 ; Bth. Fl. Austr. II. 465 ; WA. Prod. I. 34 ; Wight Illust. t. 20.—(*D. lunata*, Ham. in DC. Prod. I. 319 ; Hook. Icon. t. 54 ; Planch. in Ann. d. sc. nat. 3 ser. IX. 296 ; Hf. and Th. in Linn. Proc. II. 82 ; *D. Lobbiana*, Turcz. in Bull. d. Nat. Mosc. 1854. 343).

HAB. Not unfrequent on laterite grounds in the hill-eng-forests, from Martaban down to Upper Tenasserim, at 1500 to 3000 feet elevation ; also in boggy places on the top of the Nattoung, east of Tounghoo, at about 7100 feet elevation.—Fr. March Ap.

### *HAMAMELIDEÆ.*

#### *Conspectus of Genera.*

**BUCKLANDIA.**—Flowers in heads, polygamous. Petals of male flowers linear. Filaments elongate. Evergreen trees, the stipules large, deciduous.

**ALTINGIA.**—Flowers in 1-bracted heads, unisexual. Stamens in male flowers head-like clustered. Petals none. Leaf-shedding trees. Stipules small.

#### **Bucklandia, R.Br.**

1. *B. POPULNEA*, R.Br. in Wall. Cat. 7414 ; Griff. in Asiat. Research. XIX. 94. t. 13 and 14 ; Miq. Fl. Ind. Bat. I/1. 836.—(*Liquidambar tricuspis*, Miq. l. c. 1097 and Suppl. Fl. Sum. 346. t. 4.)

HAB. Frequent in the damp hill and the stunted forests of the Martaban Hills, east of Tounghoo, at 4000 to 7200 feet elevation.—Fl. March.

#### **Altingia, Noronh.**

1. *A. EXCELSA*, Noronh. Verh. Bat. Genootsch. V. 1-20. (*Liquidambar Altingia*, Bl. Fl. Jav. Balsamifl. 8. t. 1—2 ; Miq. Ind. Bat. I/1. 836 ; *Sedgwickia cerasifolia*, Griff. in Asiat. Research. XIX. 98. t. 15—16).

HAB. Ava, Khakyen Hills, east of Bhamo (J. Anderson) ; Tenasserim, locally (as along the Nanta-yoke choung) quite abundant (Rev. F. Mason).—Fr. March.

(To be continued.)



XVII.—On the *Helicidæ* collected during the Expedition into the Dafla Hills, Assam.—By Major H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S., &c., Deputy Superintendent Topographical Survey of India.

This list contains nearly all the species of *Helicidæ* that were obtained during the Expedition of 1874—75.

There are still a few that have not yet been determined: they will be worked out and those of them that prove to be new described by Mr. G. Nevill, from the series presented by me to the Indian Museum.

I was in hopes that Mr. Nevill would have been able to join me in completing the list; but his many other duties and late unavoidable absence from Calcutta have prevented this, and as the plate must appear now, I am compelled to give it thus incomplete.

#### HELIX LUBRICA, Bs. ? Plate VIII, Fig. 9.

Until I had examined the animal I should have supposed it to possess the usual truncate glandular form at the extremity of the foot. It shews how carefully we should examine the living animals before grouping these very similar forms of *Helicidæ*, and how much has to be done in this direction. I give a description and drawing of this species.

Animal—fore part of foot and head, as well as the tentacles, dark slate, extremity of foot pointed (no gland visible), pale grey, edged light fleshy, sole of foot dark orange, mantle very slightly reflected in front, with no tongue-shaped process,—it is, in fact, very similar to that of *Vitrina*.

Length, 2·0", tentacles 0·5". Shell-major diam. 0·95".

HAB.—Shengorh Peak, 7000 ft.

#### HELIX (NANINA) BILINEATA, n. sp., Plate VIII, Fig. 8.

Shell globose, very thin, transparent, greenish yellow. Whorls 5, spire conoid. The living shell appears mottled on the upper surface with black and white from the body of the animal shining through its thin and transparent walls.

Animal—the foot pale ochraceous; tentacles black, the black extending on to the neck as two very conspicuous well-defined parallel lines; the upper part of the foot has also two parallel black lines. From the right anterior margin a long tongue-like process is given off, which reaches, when fully extended, up to the apex of the shell, as in the large form, *Nanina decussata*.

HAB.—Tanir Lampa ridge, 4000 ft. Very abundant in the forest among the fallen leaves.



*HELIX (NANINA) GLOBOSA*, n. sp.

Shell very globose, thin and glassy, pale ochre, whorls 4, the last large and expanded below. Aperture broadly lunate. Apex rounded.

Alt. 0.28", major diam. 0.40".

Animal, dark grey, becoming pale fleshy on extremity of foot, which is broad behind, with the lobe over the gland much hooked. Tentacles rather thick at base. Length 1.2", tentacles 0.2".

HAB.—Summit of Toruputu Peak.

This shell is of the form of *H. salius*, but is much larger; and the animal differs considerably.

*Helix (Rotula) vidua*, W. Blf.

Both at Shengorh 7000 ft. and at the base of the hills at the Burroi gorge, and in the woods skirting the Pichola nulla, far out into the plains, a small globose form was found everywhere very abundant.

Alt. 0.28", major diam. 0.50".

*Helix (Rotula) climacterica*, Bs. Torúpútú Peak.

*Helix remicola*, Bs. Burroi Gorge.

*Helix (Trochomorpha) acris*, Bs. At low elevations.

*Helix (Plectopylis) macromphalus*, Bs. On Shengorh the form is very small, very dark coloured, and with a tendency to be hirsute. It does not differ in other respects, and was found generally distributed.

*Helix (Nanina) oxytes*, Bs. Of the usual typical form. General up to 7000 ft.

*Helix (Trachea) cestus*, Bs. Pichola nulla, in plains of Durrang.

*Helix (Macrochlamys) honesta*, Gould. Toruputu Peak.

*Helix (Trochomorpha) diplodon*, Bs. Outer hills, at low elevations.

*Helix (Trochomorpha) castra*, Bs. Burroi Gorge and banks of upper Dikrang River.

*Helix (Plectopylis) plectostoma*, Bs. Pichola nulla and Burroi Gorge,—common.

*Helix Huttoni*, var. *tapeina*, Bs. Burroi Gorge.

*Helix (Nanina) bascauda*, Bs. About 3000 ft. in Dikrang valley,—not common.

*HELICARION OVATUS*, H. Blf.

This species, originally described from Darjiling, I was glad to find in this new locality so as to be able to add a description of the animal. It was tolerably abundant.

Animal dark slate colour on head, extremity of foot pale, with a rosy tint in middle of body. Length 1.1", tentacles (rather short) 0.20".

HAB.—Found on Shengorh peak, at 6000 feet.



*HELICARION (HOPLITES) VERRUCOSUS*, n. sp., Plate VIII, Fig. 5.

The shell with animal was placed in spirit, but has been unfortunately lost: it was thin and glassy, with about 4 whorls. I, however, made a careful drawing of the animal at the time it was taken, and described it thus:—

Animal dull purplish grey; mantle lobes, which can cover the entire shell, are very minutely mottled, and have a finely papillate surface. On the posterior margin are six blunt and larger wart-like processes, arranged 3 on the right and 3 on the left side. Posterior part of the foot well ribbed diagonally, in parallel lines; there is a distinct marginal line to the edge of the foot. The mucous gland is larger and the upper lobe well pointed. Tentacles moderate. The mantle is divided into three lobes, one of rectangular outline is on the anterior left margin. The shell when the animal is in motion is very slightly exposed.

Total length 1.25", mantle 0.60", mantle to extremity of foot 0.50", tentacles 0.20".

HAB.—Under Torúpútú Peak, at 4,600 feet. Found on decaying wood during damp weather.

Among some very excellent drawings of the late Dr. Ferd. Stoliczka is one of a *Helicarion* very similar to this in form and in the papillate surface of the mantle, only that the papillæ are more generally distributed, and the animal is of a dull brown colour.

*HELICARION MINUTUS*, n. sp., Plate VIII, Fig. 1.

Shell ovate, depressed, rather solid, brown with an olive tinge, and with a glazed polished surface. Whorls 3, very rapidly enlarging. Aperture oblique, elongately lunular.

Major diam. 0.22", minor diam. 0.18".

Animal pale horny, tentacles and a line from them to the mantle dark coloured, with a dark line down the upper surface of the extremity of the foot, which last is mottled on the side. The mantle just covers the edge of the shell and the right posterior lobe is moderately developed. The portion of the body anterior to the shell is very short in comparison to the posterior part.

It may be known from *H. salius* by its much flatter form.

The animal of *H. salius* from a living specimen taken at Mairang in the Khasi Hills is as follows:—

Pale yellowish, with a tinge of orange on foot; tentacles pale, short, a dusky line on upper surface of the posterior portion of foot. Mantle slightly reflected over the edge of the shell. Jumps about actively when handled. Shell (pale green) 0.30". Length of animal 0.6".

I have a form exactly similar from the west Khasi Hills, but none of the shells are so rich in their coloration.



**HELICARION (HOPLITES) RADHA, n. sp., Plate VIII, Fig. 4.**

Shell similar to that of *H. Shillongensis*. Animal rich ochre, sparsely dappled with grey-black on the mantle and tail.

Length 3·0", head to mantle 0·50", mantle 1·3", mantle to end of foot 1·0", tentacles 0·38".

HAB.—Banks of Rádha Pokri (tank) near Narainpur, Darrang District,—only one specimen was found. This is a close ally of *H. brunnea* and *H. Shillongensis* of the Khasi Hills, but differs in coloration and in the markings of the mantle.

**HELICARION (HOPLITES) CINEREUS, n. sp., Plate VIII, Fig. 2.**

The shell was not described when taken and it has since been mislaid. The description of the animal, which is of more importance, I can give.

Animal, when fully extended, long and narrow, colour dusky grey, mantle with a papillated surface slightly spotted, the spotting being coarser on the body and tail. Tentacles short and blunt, with the oral ones very close below them.

Length 0·75", mantle 0·40".

HAB.—On the Darpang river, foot of the Daffa Hills, under old logs in the forest.

**HELICARION (HOPLITES) BURTII, n. sp., Plate VIII, Fig. 6.**

Shell dull white, very horny in texture, the apex scarcely developed, outline rounded above.

Major diam. 0·30".

Animal grey-brown in colour, the largest measuring as follows:—

Mantle to head 0·40"; mantle 0·80", mantle to extremity of foot 0·50", or total length when moving about 1·5".

HAB.—The Borelli Tea Garden near Tezpur, Assam, discovered by Mr. J. Burt, after whom I name it, and who found it abundant on the bark of trees during the rains (July). It is of the true typical form of *Hoplites*, but in its very rudimentary white, horny shell it is quite distinct from any of the other species I am acquainted with.

These molluscs are abundant during the rainy season in this part of India, but are hard to discover in the cold weather, and only then under stones and logs in damp low situations. In July I found *H. croceus* very plentiful just above Teria Ghat, and I observed them, when I was hunting for butterflies, crawling about over the tall grasses 12 feet from the ground.

**TESTACELLA ? DIKRANGENSIS, n. sp., Plate VIII, Fig. 7.**

Shell dextral, ovate, very flat, solid, the lines of growth well marked, with a dark brown epidermis, the apex cap-shaped, rather produced, and much curved.





Major diameter 0.50", minor diam. 0.25".

Animal not seen.

Two dead shells were found in a damp low piece of forest near the Dikrang river close under the village of Pachitah, or Camp 7.

The shell is a peculiar form, the body whorl spreading out and overlapping in front, giving the shell a limpet-like shape. Without a knowledge of the animal it is very difficult to say in what genus it should be placed, but it is probably a *Helicarion* form. The shell, however, so much resembles *Testacella* that I have placed it temporarily in that group.

*PHILOMYCUS (INCILLARIA) CAMPESTRIS*, n. sp., Plate VIII, Fig. 3.

No shell.

Animal pale ochre, with a longitudinal dark stripe on the side of body. Tentacles very short, only 0.13". Total length 1.65".

HAB.—Found on the damp grass early in morning at Kholabari in the Darrang District,—only one specimen seen.

I must here allude to a similar form of slug which I have recorded in my note-book as *Philomycus monticolus*, and which I sketched at the time it was taken in the hills bordering the Kopili river, North Cachar Hills. Animal white, tinged with pale lilac, having intensely black spots scattered over body, with one longitudinal band of same colour along the side, and one central down middle of back; foot white below; tentacles very short, brown, the two lower ones wide apart and very short indeed. Extremity of foot pointed. Total length one inch.

*OPEAS NEVILLI*, n. sp., Plate VIII, Fig. 12.

Shell turreted, very elongate, pale, silky with a green tinge, older specimens of a pale straw-colour, covered with a thin epidermis, beautifully striate under lens. Whorls 11—12, moderately rounded and very gradually diminishing in size to the apex, which is blunt; suture impressed; aperture angular above, outer lip thin.

Alt. 0.55", major diam. 0.10". Largest specimens, 0.90".

HAB. This very delicate elongate shell was common on Toruputu Peak, but far finer specimens, equal in size to the figure, were obtained on the banks of the Pichola Nulla out in the plains. I am not satisfied with this figure; the whorls being rather too flat and the apex too sharp.

I have named this shell after my friend Mr. G. Nevill, with whom I have now so long been associated in the study and collection of Indian land-shells.

*Achatina (Glessula) hebes*.

*Glessula crassilabris*, Bs. Shengorh and Torúpútú.

*Glessula illustris*, G.-Austen. Torúpútú Peak. Found at the same altitude as the original typical form from the Nágá Hills. In forest.



*Glessula orthoceras*, G.-Austen. Splendid specimens of this shell were obtained at Harmutti and in the Burroi Gorge, where it was very common. The largest measure as much as 2.85 in length by 0.5" in major diameter.

*Glessula Cassiaca*, Bs. Torúpútú.

GLESSULA DAFLAENSIS, n. sp., Plate VIII, Fig. 10.

Shell elongately turreted, thick, obliquely striate, covered with a thick olive-green epidermis with a few dark streaks. Spire turreted, slightly convex in outline, apex blunt; whorls 11, rather flat, specimens with apex preserved shewing erosion of the surface. Suture well marked. Aperture oblique, suboval, pale grey. Peristome acute, columellar margin slightly curved and but little thickened.

Alt. 1.9", major diam. 0.41", alt. ap. 0.42".

HAB.—Shengorh Peak, rather abundant. This shell would appear to have a close connection with *G. erosa*, H. Blf., from Darjiling, but its much longer form, greater number of whorls, and the different colour of its epidermis (which is uniform throughout), at once distinguish it. As in *G. erosa* the position of former apertures is distinctly indicated on the whorls.

BULIMUS MASONI, n. sp.

Shell sinistral, acuminate oblong, thick, side of spire rather flat, whorls 7, smooth and shiny, under lens finely and spirally striate, colour sea-green, intenser below the keel, paling towards the apex, the columella dark purple, a narrow fillet of same colour borders the suture closely below, commencing at the upper and outer angle of the aperture. Aperture oval, angular above, lip slightly reflected. The last whorl slightly keeled.

Alt. 1.2", major diam. 0.5".

HAB. Dihiri Parbat, 2000 feet. Only two specimens were found.

This handsome *Bulimus* is very similar in form to *B. Sylheticus*, Reeve, but this latter shell is smaller, exhibits no trace of spiral striation, has its surface more polished, while the columellar margin and outer lip is pure white; and in dozens I have collected no trace of a band is ever seen. In colour too *B. Sylheticus* differs from the new form in being lemon-yellow with a greenish tinge on the body whorl. Reeve, I notice, erroneously describes it in the Conchol. Icon. Bul. 564 as bright yellow, and makes a great blunder about its habitat, which is given as "Sylhet, Eastern Himalayah," Sylhet being a district south of the Khasi Hills in the plains of Lower Bengal. The true home of *B. Sylheticus* is the southern slopes of the Khasi and Garo Hills; the title is therefore unfortunately misleading.

I have named this species after Mr. J. Wood-Mason, to whom I am indebted for much valuable aid both in securing collectors and preparing equipments for the field.



*Bulimus gracilis*, Hutton.

*Bulimus Nilagiricus*, Pfr. var. The form is more elongate than those I have from the Khasi Hills. It is always very local in its distribution. Found under Torúpútú Peak at 3000 feet.

Alt. 0.66".

One of the forms so curiously like those of Southern India that crop up in this province now and then, *Cyclophorus nivicola* being another so like is it to *C. Bairdii*.

*Bulimus (Harpalus) Khasiacus*, G.-Austen. Dikrang valley at 2500 ft.

*Streptaxis Theobaldi*, Bs. Low down in the Dikrang valley. Similar to the Khasi type. I figure the aperture of this shell (pl. viii, fig. 15) to shew the difference between it and the following.

**STREPTAXIS DAPLAENSIS, n. sp., Plate VIII, Fig. 14.**

Shell obliquely perforate, flatly ovate, minutely striated, white; spire much depressed, suture well marked, apex flattened, in one specimen quite flat. Whorls  $6\frac{1}{2}$ , regular to the 4th, the 5th rapidly descending, the last compressed below near the umbilicus so as to form a fold running up to a second and shorter fold on the outer margin. Aperture oblique, sub-quadrate, peristome slightly reflected. Parietal lamella one, strongly developed and connected with the parietal callus. The palatal teeth are disposed, 2 on the upper and 2 on the lower margin, with a single intermediate one, which extends further within the aperture than those above and below it.

Major diam. 0.32", minor diam. 0.21", alt. 0.15".

HAB.—Near Tanir Peak, Daffa Hills, 4000 ft.

It is a much larger, more lengthened, and flatter shell than *S. Theobaldi*, and has a greater number of whorls. In the form of the aperture it is similar to that shell, but the parietal lamella is more developed and the central palatal tooth is not so remote from the peristome but rises close on the margin. The umbilicus also is more open.

*Ennea stenopylis*, Shengorh Peak, not a common shell.

**ENNEA MILIUM, n. sp., Plate VIII, Fig. 11.**

Shell cylindrical, dull glassy, diaphanous. Spire with flattish sides, very slightly tapering below, suture shallow. Whorls 6, the last 3 smooth, the apical sub-vertically ribbed, but slightly so. Aperture oval, vertical, last whorl ascending slightly to it. Peristome thickened, a little reflected, a single tooth-like thickening on the outer margin, with another single one on the parietal side.

Alt. 0.10", major diam. 0.04".



HAB.—Shengorh Peak, 7000 ft. A single specimen only was found on tearing off the thick growth of moss covering rocks.

This very distinct but minute *Ennea* bears somewhat the character of *E. Blanfordiana*, but in its minute size and differently formed aperture it is separable. It is the smallest species of the genus from this part of India.

*Clausilia iös*, Benson, Plate VIII, Fig. 13.

Compared with Darjeeling specimens in the Imperial Museum, Calcutta. Extending the range considerably to the eastward.

CARYCHIUM KHASIACUM, n. sp., Plate VIII, A, Fig. 8.

This form, which has not been noted before, occurs very abundantly in the Khasi Hills, particularly in the large wood near the village of Nongba on the Jaintia side. I obtained specimens of it on Shengorh Peak which are rather larger than those from the above quarter. It is quite distinct from *C. Indicum*, Bs. and may be thus known from it:—

Beautifully minutely and regularly costulate throughout under lens. Whorls 6, more rounded, apex more acute; the aperture circular and larger, peristome continuous forming a callus on the antepenultimate whorl, and the columellar tooth stronger. Alt. 0.09".

I also give a drawing of *C. Indicum* (pl. viii. A, figs. 7a, b), which I do not think has been before figured; the shell fig. 7 is like *C. Boysianum*, but the three shells here depicted were all found at Mussoorie, and *C. Boysianum* was originally obtained on the banks of the river Jumna near Agra.

#### EXPLANATION OF PLATE VIII.

- Fig. 1. *Helicarion minutus*, n. sp.  
 " 2. ———— (*Hoplites*) *cinereus*, n. sp.  
 " 3. *Philomycus* (*Incillaria*) *campestris*, n. sp.  
 " 4. *Helicarion* (*Hoplites*) *radha*, n. sp.  
 " 5. ———— *verrucosus*, n. sp.  
 " 6. ———— *Burtii*, n. sp.  
 " 7. *Testacella* ? *Dikrangensis*, n. sp.  
 " 8. *Helix* (*Nanina*) *bilineata*, n. sp., nat. size.  
 " 9. *Helix lubrica* ? Benson.  
 " 10. *Glossula Daflaensis*, n. sp.  
 " 11. *Ennea milium*, n. sp.  
 " 12. *Opeas Nevilli*, n. sp.  
 " 13. *Clausilia iös*, Benson.  
 " 14. *Streptaxis Daflaensis*, n. sp.  
 " 15. ———— *Theobaldi*, Bs. the aperture, enlarged.



XVIII.—*On the Physical Explanation of the Inequality of the two Semi-diurnal Oscillations of Barometric Pressure.*—By HENRY F. BLANFORD, *Meteorologist to the Government of India.*

(Received June 22 ;—Read August 2, 1876.)

There are, perhaps, few phenomena in the domain of terrestrial physics which have received more attention than the diurnal variation of barometric pressure ; and on the causes and explanation of which, nevertheless, there is more diversity of opinion even at the present day. Dove, Sabine, Herschell, Espy, Lamont, Kreil, Broun, and many others have in turn engaged in the discussion of this vexed problem ; and, at the present time, Mr. Alexander Buchan is publishing an elaborate and most valuable *resumé* of the existing data in the Transactions of the Royal Society of Edinburgh, as a preliminary to a renewed investigation.

The general features of the diurnal variation of pressure are familiar enough to every one who has ever observed the rise and fall of the barometer for a few days in India, and most other tropical countries. From about 3 or 4 in the morning the pressure increases gradually towards sunrise, then more rapidly,—and culminates generally between 9 and 10 A. M. A fall then sets in, which becomes rapid during the hottest hours of the day, and the pressure reaches its minimum generally between 4 and 5 P. M. The pressure then increases till about 10 P. M. ; but in general does not attain the same height as at the corresponding morning hour. Lastly, a second fall brings it to a second minimum between 3 and 4 A. M., which, except on mountain peaks and at such stations as Simla and Darjiling, is never quite so low as the afternoon minimum.\*

Thus, then, the pressure rises and falls twice in the 24 hours, attaining, in general, its absolute maximum about 9 or 9. 30 A. M., and its absolute minimum between 4 and 5 P. M.

This may be taken as a general description of the phenomenon as exhibited in the tropics ; but it presents many striking variations at different

\* I must correct this statement. I find, on examining the ship's observations for the month of January recorded in the Bay of Bengal, between N. Latitude  $20^{\circ}$  and the E. C. Light Ship, *i. e.*, between 60 and 100 miles from the coast, that the form of the diurnal barometric curve afforded by them, in this respect, resembles that of hill stations ; the early morning minimum being considerably lower than the afternoon. The relation of this peculiarity to the phenomenon of the diurnal sea-breeze, and the confirmation it affords of the transfer of air from the land to the sea during the daytime, in the strata above that in which the sea-breeze prevails, which is the main topic of this paper, are obvious. I have not as yet obtained the data for other months.—*Note added January 20th, 1877.*



places, and at one and the same place at different times of the year. These variations affect the hour at which the pressure attains its maximum and minimum values, the absolute amplitude of the oscillations, and lastly, their relative amplitude. It is this phenomenon—the variation in the relative amplitude of the day and night oscillations—the probable physical explanation of which I have now to bring to notice.

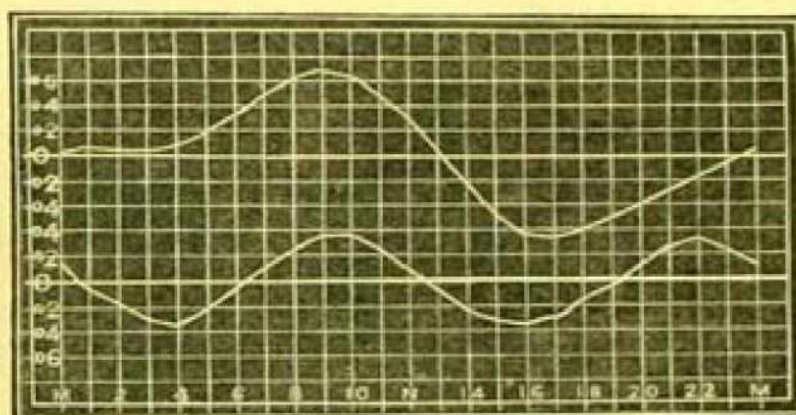
It was observed by Arago, apparently some years prior to 1841, that in Europe “the proximity of the sea has the effect of diminishing the amplitude of the interval during which the diurnal fall lasts, viz., that which occurs between 9 A. M. and 3 P. M. ;” and considering the whole phenomenon as made up of a single and double oscillation, it may easily be shewn that this interval is determined mainly by the relative amplitude of these two elements. The latest notice on the subject is given in the following extract from Mr. Buchan’s Memoir, a copy of the first part of which, (for which I am indebted to the author,) has reached me only within the last week.\* In summing up the characteristics of the midday fall of pressure, he says :—“ Whatever be the cause or causes on which the diurnal oscillations of the barometer depend, the influence of the relative distribution of land and water in determining the absolute amount of the oscillation in particular localities as well as over extended regions, is very great. From the facts detailed, (in Mr. Buchan’s paper), it will be seen that this influence gives a strong local colouring to the results, particularly along the coasts ; and that the same influence is extensively felt over the Channel, the Mediterranean, the Atlantic, and other sheets of water on the one hand ; and on the other over the inland portions of Great Britain, Europe, and the other continents ;” and, further on, he adds :—“ While, as has been pointed out, numerous illustrations can be adduced, shewing a larger oscillation over the same region with a high temperature and a dry atmosphere than with a low temperature and a moist atmosphere ; the small summer oscillation on the coasts of the Mediterranean and those of the Atlantic adjoining, is in direct opposition to the idea that any such conclusion is general. For over those parts of the Mediterranean and Atlantic, the temperature is hottest in summer, and the air is driest—so dry, indeed, that no rain, or next to none, falls ; and yet there, the amplitude of the oscillation now contracts to its annual minimum. On the western coasts of the Atlantic, from the Bahamas northwards to Newfoundland, the temperature is at the annual maximum, but the air is not dry, being liberally supplied with moisture, and the rainfall is generous. But with these very different meteorological conditions, there occurs, equally as in Southern Europe, a diminished oscillation during the summer months in the islands and near the coasts of North America ; and, in the south of Europe, the

\* Written in the beginning of March, 1876.



oscillation reaches its annual maximum, just at the season when the annual minimum occurs near the sea coasts, even although the general characteristics of the atmosphere be substantially the same in both cases."

I am not at present aware whether Mr. Buchan has been led by these observations to any definite conclusions as to the physical cause of the variation he so clearly summarizes in the passages above quoted. In the part of his memoir which has reached me, all theoretical discussion is deferred. But these passages afford such remarkable confirmation of an explanation at which I arrived some weeks since, on approaching the subject from an entirely different quarter, that I do not think it necessary to withhold longer the publication of my view. If Mr. Buchan's conclusions are the same as mine, the facts that I have to bring forward will serve to afford independent confirmation of that view.



Any person glancing over a series of curves illustrating the diurnal rise and fall of the barometer, cannot fail to be struck with the characteristic difference of those places with a continental and those with an insular climate. The case of the Mediterranean, described by Mr. Buchan, seems perhaps to be an exception; but, as I shall presently shew, it is an exception of such a kind as most strongly to confirm the rule. The accompanying curves are striking, perhaps extreme, examples of this characteristic difference. The first is that of Leh in Ladakh,\* situated in the Indus valley (the observatory being 11,538 feet above the sea), and is for the month of September. The climate is characteristically dry, and the summer heat excessive, notwithstanding the elevation. The curve for Yarkand and Kashghar still further north and only 4,000 feet above the sea, is of similar character but smaller amplitude.† The second curve figured is that for the

\* This is computed from the hourly observations recorded during six days by Captain E. Trotter, R. E., and of one day by Dr. J. Scully together with six days' observations by the latter at the hours of 4 and 10 A. M. and P. M.

† With respect to these curves however, see the final paragraph, page 328.



northern half of square 3 of the North Atlantic, published by the London Meteorological Office. In the former, the double oscillation has almost disappeared, the nocturnal fall of pressure being represented by little more than a halt for some hours between two periods of rising pressure; and nearly the whole fall of the day takes place between 9 A. M. and 5 P. M. In the case of the Atlantic curve, the day and night oscillations are almost exactly alike; the night oscillation being only slightly less than that of the day. These characteristic differences are perhaps best expressed by the ratio of the constant co-efficients  $U'$  and  $U''$  in Bessel's interpolation formula:—

$$x = M + U' \sin (n \theta + u') + U'' \sin (n 2 \theta + u'') + \&c.$$

since the magnitude of  $U'$  determines the inequality; and that of  $U''$ , though variable under different conditions of climate, is so to a much less extent than the former term, and chiefly depends on the latitude. The following are the values of  $U'$  and  $U''$  in English inches, and their ratios, for the mean diurnal curves of a few stations (chiefly Asiatic). The arcs  $u'$   $u''$  corresponding thereto are also given.

| C          |             | $U'$  | $u'$     | $U''$ | $u''$    | $U' : U''$ |
|------------|-------------|-------|----------|-------|----------|------------|
| Yarkand    | (9 months)  | ·0348 | 4° 33'   | ·0215 | 161° 59' | 1·6 : 1    |
| Leh        | (September) | ·0517 | 343° 9'  | ·0254 | 143° 19' | 2 : 1      |
| Lucknow    | (Year.)     | ·0265 | 341° 30' | ·0355 | 168° 53' | 0·75 : 1   |
| Hazaribagh | "           | ·0193 | 349° 46' | ·0343 | 145° 45' | 0·56 : 1   |
| Calcutta   | "           | ·0265 | 341° 24' | ·0391 | 151° 7'  | 0·68 : 1   |
| Bombay     | "           | ·0179 | 337° 17' | ·0385 | 157° 13' | 0·46 : 1   |
| Batavia    | "           | ·0240 | 24° 7'   | ·0369 | 159° 34' | 0·65 : 1   |
| Square 3.  | Atlantic    | ·0055 | 354° 51' | ·0319 | 159° 26' | 0·17 : 1   |

As a general rule, the more humid the station and the smaller the range of temperature, the smaller is the value of  $U'$ ; and hence it has sometimes been spoken of as the temperature element of the oscillation; the double oscillation which is superimposed on it, being referred by Dove, Sabine, and Herschel to the varying tension of water vapour, by Lamont and Broun to some solar influence other than heat, and by Espy and Kreil to the oscillation of pressure produced by heat in an elastic fluid expanding and contracting under the influence of gravity. To me it seems that there can hardly be a doubt that the last explanation is the true one,\* and

\* True, that is to say, as thus stated in general terms. I do not however fully accept the detailed explanation afforded by any of these authors; and I am disposed to think that a more probable explanation of the morning oscillation is to be found in the retardation which the transmission of the exalted pressure of the lower to the higher strata must meet with, in the great thickness of highly attenuated but exceedingly cold air which constitutes these strata. This pressure cannot be transmitted



that this has not been generally recognized, I attribute to the fact that the consequences of the theory, as a purely physical problem, have never yet been traced out and verified by such a mass of facts as Mr. Buchan is now bringing together. So long as the *whole* phenomenon is not satisfactorily accounted for, some doubt may reasonably attach to the explanation offered of one only of its elements.

My own attention was first drawn to the subject of the explanation which I am about to give, by a paper of Mr. F. Chambers in the Philosophical Transactions for 1873, in which that gentleman showed as the result of an analysis of the diurnal variation of the winds at Bombay, that one element of this variation is a double rotation of the wind direction; of such a character, that the southerly components attain their maximum value at the epoch of the most rapid semi-diurnal rise of pressure, the easterly components at the epoch of maximum, the northerly with the most rapid fall, and the westerly with the epoch of minimum. On these facts Mr. Chambers based a suggested explanation of the barometric tides, regarding them as a phenomenon of static pressure; and assumed (as now appears, on insufficient grounds) that the phenomenon in the northern hemisphere is generally of the same type as at Bombay. There was indeed one feature in his explanation, which it seems difficult to reconcile with mechanical laws; since he supposed air to flow from both east and west towards a region where the pressure has already risen above the mean, and by its accumulation to produce a maximum of static pressure. But apart from this, the discovery was an important one; and, since it clearly shewed that a regular horizontal transfer of air corresponded to the oscillations of pressure, it held out a promise that further steps in the same path might clear up what appeared to be anomalous, and possibly lead to a complete explanation of the diurnal oscillation.

Some time before this paper reached me, the Rev. M. Lafont had placed in my hands four years' traces of a Seechi anemograph, erected on St. Xavier's College, Calcutta; and these having been measured off, tabu-

with a greater velocity than the sound wave, and it is probably much less; since the action being slow and prolonged, the heat developed by the compression must be in part dissipated. To explain the observed phenomenon on this hypothesis, the retardation must however be such, that the unrelieved excess of pressure at the ground surface, must be equal to that generated by from half to three quarters of an hour's action of the sun.

This would require us to assume a much lower average temperature for the higher strata than results from Pouillet's calculation, and also that a certain diurnal oscillation of temperature affects the atmosphere to a greater height than has been usually assumed. But this hypothesis is free from most of the objections to be urged against those of the authors quoted.—*Note added January 20th, 1877.*



lated, and reduced, I was interested to find that the diurnal wind variation at Calcutta showed the double diurnal oscillation quite as distinctly, and relatively even more prominently than that of Bombay. But one important difference presented itself. The north and south elements of the oscillation, while agreeing in epoch with those of Bombay, were reversed in direction; and, taken together with the latter, showed a tendency to a cyclonic circulation of the atmosphere around the peninsula during falling pressure, and an anticyclonic circulation with rising pressure. Moreover, the east and west components agreed almost exactly, in epoch, with the north and south components; the result being a movement of air from the north-west with falling pressure, and from the south-east with rising pressure. These facts, taken in conjunction with the positions of Bombay and Calcutta on opposite sides of the peninsula, seemed to point to the differential conditions of land and water as being probably concerned in the phenomenon. Another and not less important fact connecting the winds with the diurnal oscillation of the barometer appeared at the same time. When the wind variation was analysed by Bessel's method, there appeared an east and west oscillation of considerable magnitude, corresponding in epoch with the barometric inequality expressed by the first periodical term of the barometric formula. This was easily distinguished from the oscillation of the sea and land winds, since the latter are nearly north and south at Calcutta. At Bombay where the sea and land breezes are nearly east and west, such an oscillation would be undistinguishable, even if it really existed.

The east and west oscillation of diurnal period indicates an outflow of air to the eastward during the day time, an inflow from the east during the night; and the former phase of it evidently corresponds to the hot winds of the Gangetic plain and Northern India and, indeed, to the day winds of the dry months of the greater part of India. They blow towards the sea from the eastward, only in the western portion of the Dekhan, Mysore, &c. This system of day winds consists of an outflow of air from the peninsular towards the sea on both coasts, the westerly direction greatly predominating.

The next step in the enquiry was to ascertain what general cause would operate to produce this efflux and influx of air; and the obvious suggestion was that it must consist in the differential action of the sun's heat on dry air and water.

Let  $V$  be any volume of dry air at pressure  $P$  and absolute temperature  $T$  and let  $\tau$  units of heat be communicated to it, raising its temperature from  $T$  to  $T+t$ , while the volume remains constant. The pressure will be increased thereby from  $P$  to  $P+p$  wherein—

$$p = P \left( \frac{T+t}{T} - 1 \right) = P \frac{t}{T} \dots\dots\dots (1)$$



And 
$$\tau = V\rho \frac{P}{P} \frac{T_0}{T} tc \dots\dots\dots (2)$$

Wherein  $\rho$  is the density of air at the standard pressure  $P$  and absolute temperature  $T_0$  and  $c$  its specific heat at constant volume, compared with water as unity.

If now the same quantity of heat  $\tau$  be employed in evaporating water at temperature  $T$ , (the whole being consumed as latent heat) and filling the volume of air  $V$  with vapour at pressure  $p'$ , the total pressure will become

$P + p'$  and 
$$\tau = V\epsilon \frac{p'}{P} \frac{T_0}{T} \lambda$$

when  $\epsilon$  is the hypothetical density of water vapour at  $P$  and  $T_0$ , and  $\lambda$  its latent heat at temperature  $T$ . Substituting for  $\epsilon$  its approximate equivalent  $\frac{5}{8} \rho$

$$\tau = V \frac{5}{8} \rho \frac{p'}{P} \frac{T_0}{T} \lambda \dots\dots\dots (3)$$

and equating (2) and (3) and eliminating common factors,

$$p' = \frac{P}{\frac{5}{8}} \frac{tc}{\lambda} \dots\dots\dots (4)$$

From (1) and (4).

$$p = p' \frac{5}{8} \frac{\lambda}{Tc} \dots\dots\dots (5)$$

which gives the ratio of the increase of pressure produced by the same quantity of heat, employed in the one case simply in heating dry air, and in the other in charging it with vapour. At a temperature of  $80^\circ$  Fahr. =  $T = 541$ ,

$$p = 7.36 p'$$

that is to say, when a given quantity of heat is employed in heating dry air at the temperature of  $80^\circ$  it raises its pressure more than seven times as much as when it simply charges it with vapour without altering the temperature. With lower values of  $T$  the difference will be still greater.\*

This great difference is no doubt much reduced in nature by the effects of radiation; and while some evaporation is effected on the land surface, there is some increase of temperature over the sea: but it may be expected that some part of this difference will manifest itself in the greater intensity of the forenoon pressure in the lower strata of the atmosphere on the land as compared with the sea, and in fine clear weather as compared with cloudy weather, when banks of clouds present an evaporating surface. With

\* Substituting for  $\lambda$  the general value determined by Regnault 1091.7 — .695 ( $T - 493.2$ ) the general expression for the ratio becomes

$$p = \left( \frac{5400.87}{T} - 2.61 \right) p'$$



regard to this latter point, it has been shewn by Lamont and Kreil's investigations, that between clear and cloudy days there is a difference of this kind; and that it is manifested, not only in the greater magnitude of the diurnal coefficient  $u'$ , but also, although to a much less degree, in that of the semidiurnal coefficient  $u''$  of the barometric formula. Further evidence of the same kind is afforded by the values of these coefficients for the several months at Calcutta.

|                 | $U$   | $u'$     | $U''$ | $u''$    |
|-----------------|-------|----------|-------|----------|
| January,.....   | ·0287 | 330° 18' | ·0415 | 151° 34' |
| February, ..... | ·0319 | 327° 12' | ·0423 | 146° 48' |
| March, .....    | ·0343 | 329° 27' | ·0437 | 146° 44' |
| April, .....    | ·0361 | 336° 53' | ·0425 | 146° 38' |
| May, .....      | ·0325 | 344° 43' | ·0385 | 148° 13' |
| June, .....     | ·0218 | 357° 28' | ·0336 | 146° 23' |
| July, .....     | ·0192 | 2° 6'    | ·0396 | 150° 30' |
| August, .....   | ·0218 | 0° 5'    | ·0372 | 144° 29' |
| September,..... | ·0232 | 354° 41' | ·0400 | 151° 25' |
| October, .....  | ·0234 | 343° 12' | ·0393 | 160° 59' |
| November, ..... | ·0250 | 337° 38' | ·0399 | 164° 22' |
| December, ..... | ·0270 | 335° 18' | ·0411 | 158° 55' |

The driest months in Northern India being March and April, while July is the wettest and most cloudy.

On Espy and Kreil's hypothesis of the cause of the double oscillation, there is no apparent reason why the evening maximum, arising from contraction and dynamic pressure, should be equal to the morning maximum; which seems unquestionably due to the increased tension of the lower atmosphere, in consequence of heating and the introduction of vapour; and any inequality will of course appear in the value of  $u'$  or of the coefficients of other terms of odd periodicity. But the fact established by the anemometer, that an outflow of air from a heated land area takes place during the day time, at once assigns a cause for the greater part of the equality, *viz.* an alteration of the static pressure. This is not an overflow in the upper regions of the atmosphere, but an outflow of the lower strata\* or a tendency in that direction. It does not, of course, follow that, to produce a reduction in the mass of air over a continent, there should be an actual motion of the air outwards in all directions. The very small forces in action will be manifested even more in retarding inflowing currents than in accelerating efflux; and it is only in very dry and highly heated region such as India, that they produce well marked diurnal surface winds blowing outwards towards the sea; winds of elastic expansion, such as are the hot

\* Excepting of course in the immediate neighbourhood of the coast, when the sea breeze of the lowest stratum is a secondary effect of the outflow.



winds of India and Australia, winds which are distinct from convection currents, though, it may be, coexisting with and accelerating them. The relation of these winds to the barometric tides is very marked, but it does not seem that the differences of tidal pressure would suffice to generate them, were there not a movement of the air in the same direction, arising from more persistent differences of pressure. They probably also depend much on local and irregular differences of pressure.

The air thus removed in the day time from continental areas must collect over the nearest areas of evaporation, with the effect of \*diminishing the midday fall of pressure over those tracts; and thus seem to be explained those apparent anomalies in the magnitude of the midday semi-oscillation of the barometer, to which, in the passages quoted from Mr. Buchan's memoir, he has drawn attention; *viz.* in the case of the Mediterranean area and the Atlantic coast of North America.

The direction in which this movement of the air takes place will of course vary with the locality; but there will always be, on an average, a greater diurnal movement towards east coasts than towards those facing to the west. This may be illustrated by the case of Calcutta and Bombay, and it is more extensively illustrated by the predominant westerly direction of the land winds of India, and the cold westerly diurnal winds\* that blow across the high plains (17,000 to 19,000 feet) of the Changchenmo and Rupshu in Western Tibet. The reason is sufficiently obvious. As the great semi-diurnal waves of pressure advance from East to West, the local barometric gradient of any place (in so far as it is determined by the diurnal oscillation) will be expressed by a tangent to the existing phase of the wave. During the hottest part of the day, *viz.*, from 9 or half-past 9 to half-past 4 or 5, this gradient (which is the steepest and most prolonged of the four) inclines to the eastward and increases the declivity towards east coasts arising from the excess of pressure over the land. In the opposite direction, *viz.*, towards west coasts, it goes to diminish that declivity. At night the case is reversed. The west to east barometric gradient, from 10 P. M. to half-past 3 or 4 A. M. is in the same direction at that tending to produce an influx of air from the sea towards the land on west coasts; this however is opposed to the land wind of the coast line, which is a true convection current and arises from quite different causes; and although traceable in the wind variation at Bombay, it there manifests itself only by decreasing the velocity of the former. There are moreover independent grounds for the influence that this compensating inflow chiefly affects the higher strata of the atmosphere, while the day wind is felt in the lower and more heated strata. At Calcutta the easterly (or negative westerly)

\* This I state on the authority of Dr. Cayley who assures me that on the high plains these afternoon winds are always from the West.



tendency of the wind at night is very prominently exhibited in the curve of diurnal variation ; but, although of longer duration, it is at no time so intense as the westerly tendency in the early afternoon hours.

In like manner may be explained the difference of epoch of the corresponding phases of the semi-diurnal East and West variation at Calcutta and Bombay. The gradient of pressure, in so far as it depends on the semi-diurnal oscillation, will of course be to the West with a rising pressure and to the East with a falling pressure, and this normal tidal gradient is affected by the small difference of amplitude over land and sea, in such manner, that its changes will be accelerated as affecting East coasts and retarded as affecting West coasts. Now if we suppose that the acceleration in the one case and the retardation in the other amount to an hour or an hour and a half, and that the interval between the change in the direction of the gradients, and their effects on the wind as manifested by the anemometer, is also about an hour and a half, we should roughly reproduce the conditions shewn to exist at Calcutta and Bombay respectively.

According to this view, the local static pressure of the atmosphere, except in so far as it is affected by irregular movements, is shewn by the height of the barometer at the hours of minimum pressure, and the difference of these expresses the weight of the atmosphere removed and restored by the oscillatory movements between land and sea.

There is much reason to believe that an oscillation of a similar character takes place between low plains and deep valleys on the one hand and mountain masses on the other, the air being transferred from the low plains and valleys to the hill masses and high plains (such as those of Tibet) in the day time and returned during the night. Thus, it seems to me, are to be explained the very great diurnal oscillations of the Leh barometric curve, the great amplitude of the midday tide at stations in the Assam valley, and the diminished tide at places such as Roorkee and Lahore which lie near the hills on the margin of broad plains. Also the stormy afternoon winds of the Dipsang, Changchenmo and Rúpshu plains, and the fact that at hill stations such as Simla and Darjiling, the night barometric tide exceeds in amplitude that of the day.

---



XIX.—*Contributions towards the Knowledge of the Fossil Flora in India.*

- I. *On some Fossil Plants from the Damuda Series in the Raniganj Coalfield, collected by MR. J. WOOD-MASON.—By OTTOKAR FEISTMANTEL, M. D., Palæontologist, Geological Survey of India.*

(Received December 1;—Read December 6, 1876.)

(With Plates XV—XXI.)

The present paper is the result of the examination of a fine suite of fossil plants which has lately been brought down from Raniganj by Mr. J. Wood-Mason.\* The collections in the museum of the Geological Survey contain it is true also a good many specimens from the same coalfield and from all other localities, which on a future occasion shall all be worked out together; but Mr. Wood-Mason's collection contributes so much to our knowledge of this very important flora—containing as it does not only some perfectly new forms but also good and better specimens of some of the species already found—as to be of sufficient interest to merit separate description, and this I have undertaken at the special request of Mr. Wood-Mason.

The Raniganj coalfield belongs to that portion of the Indian sedimentary rocks which constitute the Damuda Series of the survey classification. These together with the overlying Panchet group form the lower portion of a whole system, which at first was designated the "Plant-bearing Series," but which may more appropriately be termed the "Gondwana System," the upper portion of which is formed by the Kach-Jabalpur and the Rajmahal group.

As the Damuda Series contains scarcely anything but plant-remains as relics of the life that existed during the period of its deposition, of course every contribution to the knowledge of that life is of high importance.

For although several papers have been written on this lower portion of the "Gondwana System," yet till lately no sufficient evidence as to its age has been given.

We have several excellent papers on the geology of this series.† But the palæontological papers are ephemeral only and mostly of old date; and the plants described therein were far from sufficient to enable one to form a proper idea of the horizon. Later on, when the officers of the Geological Survey began their field-work, a great many specimens from the

\* See a short note on this subject in *Rec. G. S. Ind.* IX. 4.

† Mostly in the *Memoirs of the Geological Survey of India.*



Raniganj coalfield, and altogether from the Damudas, were collected; but until recently they remained unexamined and undescribed, so that all this excellent evidence could not be used to contradict the incorrect opinions that have prevailed as to the age of the Damudas.

I think it necessary first to mention some previous papers on the palæontology and geology of the formation under discussion, to show what is the state of our knowledge of the fossils of this series.

The first mention of fossil plants from Raniganj is to be found in Ad. Brongniart's papers, 'Prodrome d'une histoire des végétaux fossils' (1828) and 'Histoire des végét. foss.' (1828), wherein is described the genus *Glossopteris*. In the 'Prodrome' we find only one species of *Glossopteris* as *Glossopt. Browniana*, Bgt., from Australia and India. In the other work\* we find a thorough description of this genus and two varieties of the species distinguished as *Glossopt. Browniana*, Bgt. var. *a. australasica* and *Glossopt. Browniana*, Bgt. var. *β. indica*, the former from Australia, the latter from Raniganj, India.† Besides this is described *Glossopteris angustifolia*, Bgt., from the same locality (Raniganj), which Mr. Wood-Mason has rediscovered. This distinction of two varieties of *Glossopt. Browniana* according to locality was repeatedly adopted until Mr. Schimper‡ at last decided upon distinguishing them as different species; in which I go along with him. This author described the Indian *Glossopteris* as *Glossopt. indica*, Schimp., restricting the name *Glossopt. Browniana*, Bgt., to the Australian species. I myself could prove it again and will discuss it further.

These forms of *Glossopteris*, as Brongniart described them, were afterwards quoted again by subsequent authors, until Schimper made the above-mentioned division.

There are also some special papers on the plants of the Burdwan (Raniganj) field.

First we have Royle's paper,§ wherein four species of plants are figured; these were:—*Vertebraria indica*, Royle. (*Vertebraria radiata*, Royle), *Trizygia speciosa*, R., *Pecopteris Lindleyana*, R., *Glossopteris danacoides*, R.

Of these *Vertebraria* has to remain; *Trizygia speciosa* is a *Sphenophyllum* with the specific name *Trizygia*||; *Pecopt. Lindleyana*, R., is an *Alethopteris* with the same specific name; *Glossopteris danacoides*, R.

\* Hist. des végét. foss. 1828, p. 222, seq.

† Brongniart writes Rana-gunge.

‡ Schimper Traité de Pal. végét., I. p. 644, 645.

§ Royle, Illustrat. of the Botan. etc. in the Himalayan Mountains, 1839. Atlas, Pl. II.

|| Unger, Genera et species plant. foss. 1850, p. 71.



is, as everybody knows, a true *Taeniopteris*, Bgt., the veins being all quite free and parallel, and nowhere exhibiting any anastomosis.

What induced Mr. Unger\* to range this fossil with *Pecopteris*, I cannot understand, and I am the more astonished that Dr. Oldham† should have adopted his determination. But this *Glossopteris danaeoides*, Royle, is identical with what later McClelland‡ described as *Taeniopteris danaeoides*, also from the Burdwan coalfield. On Plate XV. fig. 1, 1a of McClelland's report two specimens are figured, which are however certainly incorrectly represented (as regards the distance of the veins apart), but which are without doubt typical *Taeniopteris*, Bgt. Mr. Oldham did not mention these figures of McClelland.

The rest of the figures in McClelland's report are of no use, as they are so badly drawn as to give no idea of the original specimens, *Sphenophyllum trizygia*, Ung. (*Sphenoph. speciosum*, McClell.) and *Vertebraria* alone being approximately correct; of *Glossopteris acaulis* (Pl. XIV. fig. 3) I have the original specimens, which in outline resemble McClelland's figures, but the venation is totally different.

The most exhaustive paper on the geology of the Raniganj coalfield is by Mr. W. T. Blanford.§ The author establishes in his report the following subdivisions of this coalfield:—

- I. Upper Panchet group.
- II. Panchet group.
- III. Damuda group.
  - a. Raniganj Series.
  - b. Iron Shales.
  - c. Lower Damudas.
- IV. Talchir group.

Mr. Blanford has given (*op. cit.* p. 31) a comparative table of these groups with their fossils; but from this it can be seen that the separation from a palæontological point of view is not quite so strict, especially if we consider that in the lower Damudas|| occur the same *Trizygia*, viz., *Sphenoph. trizygia*, and *Sphenopteris* as in the Raniganj group;¶ and should it hereafter be proved that *Schizoneura*, Schimp. also occurs in the lower beds, then it would be completely evident that these subgroups are not far apart in age. And as I will show further on, I also think the Talchir group is to be considered as belonging to the lower Damudas and

\* l. c., p. 170.

† Mem. Geol. Surv. Ind., Vol. II. p. 329.

‡ Rep. Geol. Surv. of India, 1848—49.

§ Mem. Geol. Surv. Ind. 1865, Vol. III.

|| From Talchir in Orissa.

¶ Of course besides *Phyllothea*, *Vertebraria*, and all the species of *Glossopteris*.



that all these subdivisions are from a palæontological point of view to be joined into one series, to which the name Damuda Series may be applied.

This view has been most distinctly expressed by Mr. Oldham in a paper\* adjoining Mr. W. T. Blanford's.

In the same paper Mr. T. Oldham proposes to replace the term "Lower Damuda" by the name "Barákur group", as this term "lower Damudas" would involve a group, which should be called "upper Damuda group;" which was originally described from the Nerbudda valley, but which was afterwards proved to belong to quite a different horizon.†

Previously to this paper by Mr. Blanford, we have one on the age of the several sedimentary beds in Central India and Bengal by Mr. Oldham,‡ wherein also for the Damuda Series, to which our Raniganj plants belong, a discussion is given.

But the fossils at that time were only provisionally examined and determined and only some forms were more remarkable, such as *Schizoneura*, Sch. Mong., *Vertebraria*, Royle, *Phyllothea*, Bgt., and *Glossopteris*, Bgt. All these fossils have been ever since in our collections; and although Mr. Oldham himself recognized the *Schizoneura* to be most characteristic of the Trias in Europe, and although *Phyllothea*, Bgt., is also very frequent in some Oolitic strata in Europe, yet the author relies solely upon the occurrence of the genus *Glossopteris*, Bgt., which is also reported from Australia, as indicating an analogous age; and Mr. Oldham maintained this opinion to the last.

Mr. Oldham also states that no *Teniopteris*, a genus which is so frequent in the Rajmahal Series, occurs in the Damúdas. But as we will see further on, *Teniopterides* are not quite rare, as Royle and McClelland have already figured them, and as later they have been found again,§ and Wood-Mason has brought several fine specimens.

Soon after Mr. Oldham's paper we have another by Sir Ch. Bunbury|| on some fossil plants from Nagpúr, wherein we also find some general conclusions. Sir C. Bunbury (*l. c.*, p. 345) says, referring to Mr. Oldham's paper: "Prof. Oldham is of opinion that the Rajmahal beds are mezozoic, the Damúda beds palæozoic. On this latter point I am not entirely prepared to go along with him. I still think for the reasons already given that the facies of this Nagpúr and Burdwan flora is rather mezozoic;" and further on he says, "The palæobotanical evidence is far

\* Mem. Geol. Surv. Ind. III. p. 197 seq. et 206, 207.

† This is the Jabalpúr group of the later classification.

‡ Mem. Geol. Surv. Ind. II. 1860, p. 299 seq.

§ Mr. Hughes has also brought some specimens from the Jherria coalfield.

|| Fossil flora of Nagpúr, Q. J. G. Soc. XVII, Pls. VIII—XII.



from unequivocal, and such as it is, might be outweighed by the discovery of a single well marked and thoroughly characteristic fish, shell or coral."

But nothing of this kind has as yet been found, while on the contrary many more plants have been discovered corroborating Sir Charles Bunbury's views as to the mezozoic age of the Damudas generally and particularly claiming a Triassic age for them.

But still the plant remains remained undescribed and unexamined, and although since 1871 there have been many unmistakeable proofs of the mezozoic age of this series, more than at the time when Mr. Oldham and Sir Charles Bunbury wrote on this subject, yet Mr. H. F. Blanford, in his recent paper on the age and correlation of the Plant-bearing Series in India, &c.,\* could make no use of all the evidence the plants afforded, and had of course to content himself with repeating all that had been previously said.

Of the plant-remains, which generally speaking form the principal portion of the fossils in the Gondwanas, Mr. H. F. Blanford repeats all the provisional names which Mr. Oldham had given,† and which were mostly only generic determinations: conclusions drawn from fossils not determined with certainty cannot, of course, be correct: they are mere suppositions and bear more a speculative character.

After having been engaged to the Survey of India, I examined the greatest portion of our Damúda fossils, as far as I thought it necessary to enable me to publish preliminary notes‡ on their relations and probable age.

I will not here repeat all the discussions and results, I will only say shortly that from the fossils, which are only plant-remains, I endeavoured to show that the flora of our Damúda Series has its analogies mostly in the mezozoic epoch of Europe, and especially in the Trias, although it contains richly represented the genus *Glossopteris*, which also occurs in Australia rarely in the lower, but more numerous in the upper coal-measures, which latter are certainly also mezozoic. Considering these notes only as preliminary I gave them only very briefly, postponing all detail for a future time.

But Mr. W. T. Blanford has endeavoured to illustrate the relations from his own point of view, and we find his paper in the same number of the Records as that in which my paper on the lower portion of the Damúdas was published. I need not here repeat what I had to remark,

\* Q. J. Geol. Soc. November 1875.

† Mem. Geol. Surv. Ind. II.

‡ Notes on several fossil floras in India. I. and II. Flora of Kach, and from the Rajmahal Hills in Records G. S. Ind. IX. 2. III. IV. V. The flora of the Panchet group, Damúda Series and Talchir group, Rec. G. S. Ind. IX. 3.



but I must only state that I felt obliged to explain shortly in another paper\* what I had omitted in the former one and postponed for a future occasion when describing the Damúda fossils. It is of course only very just that Mr. Blanford should have written this paper, but I think he will on the other side appreciate all the arguments which I have brought forward.

From my paper in the 4th number of Vol. IX. Rec. G. S. J., I will repeat some only of the most important points.

To the characteristic fossils, which I had already enumerated in my first note on the Damudas, such as *Schizoneura Gondwanensis*, Fstm. (triassic type), *Actinopteris Bengalensis*, Fstm. (mezozoic type), *Neuropteris valida*, Fstm. (triassic type), *Gangamopteris cyclopteroides*, Fstm. (mezozoic), *Voltzia heterophylla*, Bgt. (triassic), I added more palæontological evidence, consisting in the discovery of—

a. *Phyllothea*, in the real sense, in the Raniganj group, by which the analogy with the Kamthi group is rendered still more evident.

b. Some specimens of *Teniopteris* (*Macrotæniopteris* and *Angiopteridium*?) from the Kamthis.

c. Some more specimens of *Sagenopteris* from the Godavari District and from Kurhurbari.†

d. A new *Gangamopteris* from the Kamthi beds.

e. A *Glossozamites* from the Kurhurbari coalfield.†

f. A *Nöggerathia* near *Vogesiacia*, Brönn, from the South Godavari district.

g. A *Voltzia heterophylla*, Bgt., again from the Kurhurbari coalfield.†

I think that these additions, which however do not include all that can be added, will modify to some extent Mr. W. T. Blanford's conclusion‡ "that the evidence, which connects the Damudas with the Australian carboniferous rocks is about equal to that which tends to show their relations with the Triassic§ rocks in Europe;" and that the evidence of a mezozoic age will be still further increased by the present contribution to the Flora of the Raniganj coalfield. The stratigraphical classification of the Damudas is at present the following :

Damuda Series (not group)

a. Raniganj—Kamti-group (not Series).

b. Iron Shales.

\* R. G. S. I. IX. 4.

† Amongst plants brought by Dr. Stoliczka in 1871; others sent by Mr. Whitty

‡ R. G. Surv. Ind. IX. 3. p. 84.

§ At any rate, if the flora does not show plainly enough a Triassic age, it indicates at least a mezozoic epoch.



- c. Barakur group, with which the  
d. Talchir group—is in closest relation.

Thus stands now our knowledge of the relations and conditions of the Damúdas, in which of course our Raniganj coal-field is included.

The flora—the only remainder of former life—of that Damúda series will be worked out as a whole later on. But in the meantime some shorter papers may illustrate certain groups of fossils which are contained in collections other than those of the Geological Museum.

Of such papers the present is the first, and the fossils were collected by Mr. Wood-Mason.

First of all I will give a list of the fossils found by Mr. Wood-Mason, then the descriptions, amongst which I also include short notices of such fossils as occurred in the Raniganj field, but were not found again by Mr. Wood-Mason.

I. LIST OF THE FOSSIL PLANTS BROUGHT BY MR. WOOD-MASON  
FROM THE RANIGANJ COALFIELD.

| Palæontological System.                        | References to Plates.      | Living affinities. | Remarks.                                                                 |
|------------------------------------------------|----------------------------|--------------------|--------------------------------------------------------------------------|
| I. EQUISETACEÆ.                                |                            |                    |                                                                          |
| Sphenophyllum Trixygia<br>(Royle.) Ung., ..... | Pl. XV, 1. 2.              | Equisetaceæ.       | Different from all<br>palæozoic species.<br>Rhizomes? and root-<br>lets. |
| Vertebraria indica, Royle, ..                  | Pl. XV, 3. 4.<br>XVI. 4.   | Equisetaceæ.       |                                                                          |
| II. FILICES.                                   |                            |                    |                                                                          |
| 1. <i>Sphenopterides</i> .                     |                            |                    |                                                                          |
| Sphenopteris polymorpha,<br>Fstm., .....       | Pl. XVI, 5-7.<br>Pl. XVII. |                    |                                                                          |
| 2. <i>Pecopterides</i> .                       |                            |                    |                                                                          |
| a. Group of Alethopteris                       |                            |                    |                                                                          |
| Whitbyensis (Schimp. 1869;<br>Fstm. 1876. .... |                            |                    |                                                                          |
| Alethopt. Lindleyana, Royle,                   | Pl. XX. 7.                 | ?                  | Fructifying speci-<br>men.                                               |



| Palaeontological System.                      | References to Plates.         | Living affinities                                                                 | Remarks.                           |
|-----------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------|------------------------------------|
| Alethopt. cmp. Whitbyensis Göpp., .....       | Pl. XXI. 6, 6a.               | Pteris ?                                                                          | In the form of Pteris tenuis, Bgt. |
| b. Type <i>Phegopteris</i> .                  |                               |                                                                                   |                                    |
| Alethopt. phegopteroides Fstm., .....         | Pl. XVIII.                    | Phegopteris decussata, Mett.                                                      | A new form of fossil ferns.        |
| 3 <i>Taeniopterides</i> .                     |                               |                                                                                   |                                    |
| Macrotaeniopteris danæoides, Royle sp. ....   | Pl. XIX. 1, 2.<br>Pl. XXI. 1. | Acrostichum ?                                                                     | Mezozoic.                          |
| Macrotaeniopteris sp. ....                    |                               |                                                                                   |                                    |
| c. Type <i>Vittaria</i> .                     |                               |                                                                                   |                                    |
| Gen.— <i>Palaeovittaria</i> , nov. gen. 1876. |                               |                                                                                   |                                    |
| Palaeovittaria Kurzi, Fstm. ..                | Pl. XIX. 3, 4.                | Vittaria.                                                                         | New genus.                         |
| 4 <i>Dictyopterides</i> .                     |                               |                                                                                   |                                    |
| Gen.— <i>Belemnopteris</i> , nov. gen. 1876.  |                               |                                                                                   |                                    |
| Belemnopteris Wood-Masoniana, Fstm. ....      | Pl. XX. 1, 2.                 | Gymnogramma sagittata Ettgh. (Hemionitis cordata, Rxbgh. Pteris sagittata, Raddi. | New genus.                         |
| Genus <i>Gangamopteris</i> , McCoy, 6.        |                               |                                                                                   |                                    |
| Gangamopteris Whittiana, Fstm. ....           | Pl. XX. 3, 4.                 | Antrophyum latifolium, Bl.                                                        | New form.                          |
| Genus <i>Glossopteris</i> , Bgt. 1828.        |                               |                                                                                   |                                    |
| Glossopteris angustifolia, Bgt.               | Pl. XXI. 2, 4.                | Pteris ? Schizoloma ?                                                             | Exhibiting a marginal line.        |
| Glossopt. communis, Fstm. ..                  | Pl. XXI. 5.                   | ?                                                                                 |                                    |
| Genus <i>Sagenopteris</i> , Bgt. 1828.        |                               |                                                                                   |                                    |
| Sagenopteris polyphylla, Fstm.                | P. XX. 5, 6.                  | ?                                                                                 | Glossopteris acaulis McCl.         |

## II. DESCRIPTIONS OF THE PLANTS FROM THE RANIGANJ FIELD.

The specimens brought by Mr. Wood-Mason represent two orders only :

### I. *Equisetaceæ* and II. *Filices*.

The specimens are almost all very well preserved in a dark grey shale, and are throughout covered with a very thin film of coal, the former vegetable substance. In this respect they differ from the most of the specimens from Raniganj in the Museum of the Geological Survey, these being mostly in a light grey rock, and only rarely covered with a coal-



film. It seems that Mr. Wood-Mason's plants are from a different clay-band.

In the description of the fossils I will always first discuss those brought by Mr. Wood-Mason, which are mostly figured, briefly mentioning the other plants known from the Raniganj field.

### 1. *EQUISETACEÆ*.

Fossil *Equisetaceæ* are known to occur throughout all the sedimentary rocks from the Devonian unto the present time. But I think this is so with the greatest portion of fossils, and has no consequence as to the possibility or impossibility of determining the age of a certain group. There are always certain differences which enable us to use a fossil organism, although it has some or very close relation in the present world, as a guide in determining the age.

So it is with the *Equisetaceæ* too; each of the formations has its peculiar forms, some of which have more or less perfect representatives in the living *Equisetum*, having a complete spathe in the *articula* of the stalk, while some others have no longer any existing analogues.

As far as I can say the peculiar forms are just in those epochs, wherein the *Equisetaceæ* are most richly developed, as in the palæozoic and mezozoic epoch (here especially in the Trias).

The palæozoic epoch is chiefly characterized by the following:—

- a. *Calamites*, Bgt.
- b. *Asterophyllites*, Bgt.
- c. *Macrostachia*, Schimp.
- d. *Cinyularia*, Weiss.
- e. *Sphenophyllum*, Bgt.\*

The mezozoic is marked by the following peculiar genera:—

- a. *Schizoneura*, Sissimp.
- b. *Phyllothea*, Bgt.
- c. *Sphenophyllum*—a peculiar form.
- d. *Vertebraria*, etc.

The genus *Equisetum* of the fossil Flora agrees, as I have already said, with living forms; and some forms which one takes as *Calamites* are certainly casts, and perhaps sometimes stalks of other *Equisetaceæ*, as well as the lower carboniferous genera *Stigmatocanna*, *Anarthrocanna*, etc., are nothing but forms of *Calamites* with scars disposed in regular arrangement.

\* *Sphenophyllum* has long since ceased to be peculiar to the carboniferous epoch, as we know it from Permian and also from the Triassic Damúdas.



I think some of these *Calamites*-like forms also occur in our Damúdas, but are generally termed *Phyllothea*.\*

Genus **Sphenophyllum**, Bgt. 1828.

*Plantæ herbaceæ; caule ramoso, ramis alternantibus aut oppositis. Caule primario crassiore, secundariis tenerioribus, interdum tenerrimis, ad articula inflatis, costatis, costis non alternantibus; internodiis in longitudine variantibus.*

*FOLIIS CUNEATIS, sessilibus, plurime in articulis verticillatis, interdum alio in modo dispositis; in numero variantibus, numerum duodecim rarius attingentibus; marginibus lateralibus integris, margine exteriori saepius dentato aut vario in modo inciso.*

*NERVO MEDIO NULO, sed nervulis pluribus, æqualibus, ex nonnullis crassiusculis repetito dichotomis. Fructificatio spicaeformis.*

This diagnosis, originally drawn up for the *Sphenophyllum* of the palæozoic epoch, I have completed so as to make it applicable also to our Damúda forms.

For in general this genus was formerly considered as characteristic of the true carboniferous formation. But later it was discovered in other portions of the palæozoic epoch also.

Dawson† mentions a *Sphenophyllum* from the Devonian in Canada; I know *Sphenophyllum* from the Culm in Silesia, and another specimen from the Permian, in the so-called Schwarte, in the Rakonitz coalfield in Bohemia and from Stepanitz near Starkenbach (Bohemia), and, finally, from the passage-bed between the Carboniferous and Permian in the so-called "Nürschan-Gasschiefer" from the Pilsen-coalfield in Bohemia‡; so that the genus is now known from all members of the palæozoic epoch. But it is also known from higher beds.

This genus is easily recognised by the shape of the leaves. These are cuneiform, sessile in the articulations of the stalk (therefore in numerous whorls on the stalk), entire on the lateral margin, but may be dentate or incised in various ways on the exterior margin. The veins are also peculiar: there is no midrib, and although the veins are numerous, they

\* In this form the *Phyllothea* belongs certainly to a great extent to *Schizoneura*, Sch.

† Dawson on the Flora of the Devonian Period in North Eastern America, Q. J. Geol. Soc., Vol. XVIII, pp. 296—330, Pls. XII—XVII; and on the fossil flora of the Devonian and Upper Silurian in Canada. London 1871. 20 Plates.

‡ Feistmantel, Ueber den Nürschaner Gasschiefer, etc. Zeitschr. d. D. geolog. Gesellschaft. 1873.



pass out from the base as two or more main-veins and spread out in the leaf surface repeatedly bifurcating.

The stalk, which as I have mentioned, is articulated, is rarely striated on the surface; the internodes are of different lengths.

As regards the nature of this genus and its relations, it was first described as belonging to the *Marsileaceae*\* by Brongniart; Lindley and Hutton† considered it to be one of those plants which in the ancient world represented the pine tribe of modern floras.

Mr. Unger in 1845‡ also placed *Sphenophyllum* with the *Marsileaceae*, while in 1850§ the same author ranged it with the *Asterophyllites*,|| placing this order, together with the *Equisetaceae* and the *Calamiteae*, in the class *Calamariaceae*; and from that time until Schimper's 'Palæontologie végétale' appeared in 1869 we find *Sphenophyllum* (as a peculiar genus) generally ranged with the *Equisetaceae*.

I think it would be quite unnatural to consider it as belonging to the *Marsileaceae*, as there in the whole world amongst all the *Marsileaceae* is not a single form which has more than one leaf-whorl coming out from the rhizome on a thin stalk, which is never articulated.

Some years ago, however, Mr. Carruthers¶ endeavoured to unite not only *Asterophyllites*, Bgt., with the genus *Calamites*, Bgt., as leaved branches of it, as Mr. Ettingshausen\*\* had already done, but also the genus *Sphenophyllum*, Bgt., although this last is so characteristic.

But quite recently we have some further investigations about this genus by Mr. Williamson†† and by Prof. Renault.‡‡

The latter author would prove that *Sphenophyllum* cannot possibly be an equisetaceous plant, just what Mr. Williamson had attempted to show in the case of *Asterophyllites*; and both these authors would have us believe that *Asterophyllites* and *Sphenophyllum* are very closely allied genera and more closely allied to lycopods than to any other plants. A communication on this subject in the above-mentioned sense I have in a letter of Mr. Williamson (1875).

\* Brongniart, Prodrôme, 1828 p. 68. Royle, l. c. p. 431. XXIX.

† Fossil Flora of Great Britain. Vol. I. 1831-33. pp. 41-44, 86.

‡ Synopsis plant. foss. pp. 112-114.

§ Genera et spec. plant. foss. p. 69 seqq.

Including *Volkmania*, *Huttonia*, *Asterophyllites*, *Annularia*, etc.

¶ The cryptogamic forests, Geolog. Magaz., 1868.

\*\* Haidingers Naturwissenschaftl. Abhandl. 1851. Flora der Steinkohlenformation von Radnitz, Abh. d. K. K. Geol. Reichsanst. 1852.

†† Philosophical Transactions, 1874. p. 41 seqq., Pls. I-IX.

‡‡ Recherches sur l'organisation des *Sphenophyllum* et des *Annularia*, Mem. del Acad. des Science. Paris. 1870.



Already at that time this author supposed that the leaflets of *Sphenophyllum* could have been produced by coalescence of leaves of the genus *Asterophyllites*, just as in *Equisetum* and in *Schizoneura*, wherein the spathes or portions of the spathes are produced by the junction of several leaflets; but in the latter genera we find the spathe traversed by simple veins only, representing the same veins as were in the separate leaflets before these grew together.

In *Asterophyllites* also we have undivided veins in the leaflets. *Sphenophyllum*, however, has repeatedly forked veins: invariably two or more main veins, originating at the base of the leaf, are continually forked until they reach the margin, so that from the two main veins we can have as many as 20—30 forked veins reaching to the margin in one leaflet.

But that which Mr. Williamson three years ago advanced as a supposition only he brought forward as an established fact before the last meeting of the British Association at Glasgow,\* saying that the wedge-shaped leaves of *Sphenophyllum* are merely the result of the coalescence of several of the leaves of *Asterophyllites*.

The learned author, who at that meeting expressed also his "strong conviction† that the flora of the coal-measures would ultimately become the battle-field on which the question of evolution with reference to the origin of species would be fought out," will certainly excuse me, taking especially our Indian *Sphenophyllum* into consideration, for entertaining some doubts as to the close relationship of *Sphenophyllum* and *Asterophyllites* in the above-mentioned sense.

As our figure (Pl. XV, Fig. 2a) plainly shows, the veins of our *Sphenophyllum* pass out as two main veins and are forked in a regular way until they reach the margin. Here no coalescence of leaflets is possible, least of all of *Asterophyllites* where the leaflets have only one undivided midrib.

Further, everybody knows very well that the leaflets of *Asterophyllites* are linear and attenuated both towards the base and towards the apex, so that they could never produce by their coalescence a wedge-shaped leaf, with the broadest portion just at the apex as in *Sphenophyllum*.

Our *Sphenophyllum* shows this further to be quite impossible by the arrangement of the leaf-whorls in the *artacula*, as we always find quite regularly three pairs of leaflets, of which one pair is smaller than the others.

The stalk also is generally thinner in the genus *Sphenophyllum*, our Indian form showing this very evidently.

If the leaflets of *Asterophyllites* were to grow together, they would

\* I have read the report published in Nature for 21st September, 1876, No. 360, p. 455, the only one which has as yet reached us.

† Ibidem, p. 456.



form either a dentate upright spathe or an oblong-oval leaf, which, however, would also be upright in the manner seen in *Equisetum* and *Schizoneura*. In the latter genus there are generally two spathe-portions, which are oblong-oval and contain as many distinct simple veins as leaflets have grown together; in some cases we see the leaflets separated again by dehiscence, but they could never produce anything like the leaf of *Sphenophyllum*, in which also the forked veins afford a chief difference.

I am much inclined to believe that both genera have the same microscopical structure and belong to the same order; but I think it is against all morphological and biological laws to suppose that linear leaflets, which are attenuated at both ends and all contain invariably only one undivided rib, could ever by their coalescence produce a wedge-shaped leaf, with a narrow base and a disproportionally broader apex, and with 2 or 3 chief veins, which are repeatedly forked to the margin.

All these relations, together with the much thinner stalks and a different fruit-spike, will, as I think, still maintain *Sphenophyllum* as a peculiar genus belonging, with *Asterophyllites*, to the same order; but that this is that of the *Lycopodiaceae*, must, as I think, be thoroughly proved\* before one can draw any conclusions.

But for the present I think it is better to leave them both in the class *Equisetaceae*, when following Schimper's system, we have:—

Class:—EQUISETACEAE.†

Order I.—EQUISETAE, true horsetails.

*Equisetum*, Linn.‡

*Schizoneura*, Schmp.§

*Equisetides*, Schmp.

*Phyllothea*, Bgt.||

Order II.—CALAMARIEAE.

*Calamites*, Suits.

*Asterophyllites*, Bgt.¶

Fruit-spikes.

*Sphenophyllum*, Bgt.

*Annularia*, Bgt.

Schimper does not mention the *Sphenophyllum* from our Damúdas at all; and his diagnosis, therefore, as referring only to the palæozoic

\* While this paper is passing through the press, I have heard that Mr. Stur of Vienna proves that *Sphenophyllum* cannot by any possibility be a Lycopod.

† The Indian forms are spaced.

‡ None in Damúdas; one species in the Rajmahal Hills.

§ Very abundant in the Raniganj group and in Trias in Europe.

|| Very frequent also in Italian Oolite.

¶ Schimper uses *Calamocladus*, Schimp.



species, is not quite complete ; and hence it is that he speaks only of forms with complete leaf-whorls in which all the leaflets are equal.

But from my more complete diagnosis is seen that there can be distinguished two groups as regards the arrangement of the leaves.

1. *With complete whorls.*

This group would include the palaeozoic forms.

2. \* *With incomplete whorls.*

In this I place the Triassic forms of our Dāmúdas. A case analogous to this we will find in *Neuropteris*, Bgt., wherein the bi- and tri-pinnate fronds belong to the palaeozoic epoch, while the single-pinnate forms occur in the Trias.

SPHENOPHYLLUM TRIZYGIA, Ung., Pl. XV, Figs. 1, 2, 2a.

1839. *Trizygia speciosa*, Royle, l. c. p. XXIX. p. 431, Pl. 2. f. 8.

1845. ———, Unger Synopsis. plant. foss. p. 114.

1850. *Sphenoph. speciosum*, McClell., Report, p. 64. Pl. XIV. f. 5.

1850. *Sphenoph. trizygia*, Ung., Gen. et. sp. pl. f. pag. 71.

1860. *Sphenophyllum*, T. Oldham, M. G. Surv. II. p. 316.

1865. *Trizygia*, W. T. Blanford, Raniganj coal field M. G. S. Ind. III. p. 31.

1876. *Sphenoph. Trizygia*, Feistmantel, Notes etc., Rec. G. S. I. IX. 3. p. 70.

*Caule articulato, tenerrimo, fluctuante (?) ; foliis senis in articulis, totum verticillum haud formantibus, sed unilateraliter in tria paria dispositis ; pare summo longissimo, imo brevissimo minimoque, medio medio-cri. Foliis obovato-oblonge cuneiformibus ; NERVO MEDIO NULLO, nervulis crebris aequalibus EX DUOBUS primariis regulariter dichotomis.*

Stalk articulate, very slender, floating (?) ; the leaves by six in each articulation, not forming a complete whorl, but disposed on one side of the articulum in three pairs ; the uppermost pair the longest, the lowermost the smallest ; the leaflets oblong-cuneiform, ; no midrib, but the veins numerous, equal, regularly dichotomous out of two chief veins.

Of this interesting species Mr. Wood-Mason has brought several nice specimens, of which I figure two, to show the different sizes, the lower leaflets being much longer than the upper ones.

The collections of the Geological Survey contain also a great many specimens of this species ; and other figures will be given in the 'Palæontologia Indica'.

This species was first discovered by Mr. Royle and figured and mentioned as *Trizygia speciosa* ; with this name we find it still in Unger's Synopsis (1845) and in the Mem. G. S. India. But McClelland in 1850 and Unger also in 1850 placed it with *Sphenophyllum*, Bgt., the former keeping the older specific name, *speciosum* ; the latter substituting *trizygia*



for it, which I adopt too, as it shows that the species belongs to the genus *Sphenophyllum* and has the leaves in three pairs (*trizygia*), while it at the same time recalls Royle's generic name.

That the fossil under discussion belongs to *Sphenophyllum* cannot, I think, be doubted, as all the characters of the stalk and of the leaves agree well.

But it has a very characteristic peculiarity in the leaves, which is constant in all specimens hitherto found: it is that there are in all specimens only six leaflets in each *articulum*, forming three pairs of different lengths and sizes, arranged on one side of the articulation. The leaflets are entire; the veins are very numerous in the broad portion of the leaflets; they begin as two main veins, which are forked at almost equal distances dichotomously, until one can count 18—20 at the apical margin; some of them, especially those on the lateral margins, are continued undivided after the second or third furcation.

By this condition of the leaves, our species differs totally from all palæozoic forms, and is not at all opposed to the view of a mezozoic age for the Raniganj group; and thus the division of this genus into two groups is quite justifiable.

But there is another circumstance which renders this fossil important.

It was formerly known only from Raniganj, and McClelland's specimens came from that locality. But later it occurred also at Talchir (Cuttack) in Orissa, in a dark sphærosideritic shale. These beds near Talchir and Cuttack had hitherto been ranged with the lower portion of the Damúdas or the Barakúr group.

The specimens from the Raniganj and Barakur group represent the same species, only in the latter they are generally of slightly smaller size.

We have, therefore, in *Sphenophyllum trizygia* already one typical species which is common to the upper and to the lower portions of the Damúdas.

Lately Mr. Schenk\* described a form from the Wealden as *Marsilidium speciosum*; but if I see aright, this form also exhibits two whorls of leaves in the articulations of the stalk, and it would have been more natural to have ranged it with *Sphenophyllum*, as it is well known that no known *Marsileaceae* have more than one whorl of leaves.

Besides the *Sphenophyllum trizygia*, Ung. there are known from the Raniganj coalfield other important forms belonging to the *Equisetaceae*, which I cannot omit to mention, but of which I give only a few figures,

\* Fossile Flora der Wealdenformation; Palæontographica, Cassel, 1871, p. 225. Pl. XXVI, Fig. 3.





because no representatives of them are amongst Mr. Wood-Mason's specimens, and because those from our collection will be hereafter figured sufficiently in the 'Palæontologia Indica.'

Genus **Schizoneura**, Schimp. 1844.

This very peculiar genus was established by Mr. Schimper\*. It was formerly known only from the Trias, of which formation it is especially characteristic; Schimper† having only recently placed the Rhætic *Calamites Hoerensis*, Hss.‡ in this genus as *Schizoneura Hörensis*, Schimp.; so that this author can well say (l. c., p. 282), "*Le genre Schizoneura caractérise le Trias et les couches Rhétique.*"

The species of *Schizoneura* known at present are:—

*Schizoneura paradoxa*, Schimp. (l. c.), from the Upper Grés Bigarré (Lower Trias) in the Vosges.

*Schizoneura Meriani*, Schimp., from the Keuper near Stuttgart, Salz-sur-le-Necker, etc.

*Schizoneura Hoerensis*, Schimp., from the Rhætic at Hoer in Scania, Salzgitter in Hanover, etc.

This genus is a very characteristic one. It has an articulated stalk or stem; the originally separate leaflets are grown together into a spathe, which, however, attains a much greater length than the internodes and consequently bursts generally into two pretty equal portions, each containing as many pretty thick ribs as there are leaflets grown together. Owing to the original form of the leaflets (narrower at base and towards the apex), these two portions have an oblong oval shape and are always directed upwards. Sometimes the dehiscence goes further still, so that we find one portion of the spathe only entire and the other split into several leaflets, or even both portions are resolved into leaflets.

In our Raniganj group this genus is very abundantly represented, especially at Raniganj, specimens from which locality have been for many years (16) in the collections of the Geological Survey. But up to date neither figures nor descriptions of it have been published.

It is simply mentioned as *Schizoneura* in the Mem. G. S. India. Lately§ I examined the specimens and found the species identical with that in the Panchet group. I established it therefore as follows:—

\* Schimper et Mougeot, Monogr. d. plant. foss. du grés bigarré 1844, pp. 48—51, Tab. XXIV—XXVI.

† Pal. végét. I, p. 283.

‡ Hiesinger, Lethæa Succ. Supp. II, p. 5, Tab. XXXVIII, Fig. 8.

§ Rec. G. S. Ind. IX, 3, p. 69.





SCHIZONEURA GONDWANENSIS,\* Fstm., Pl. XVI, Figs. 1—3.

1876. Feistmantel, Rec. Geolog. Surv. Ind. IX, 3, p. 69.

*Trunco articulato ramoso, caule† articulato, striato, variabili altitudine ac latitudine, foliolis 12—22, plerumque duas in partes vaginae coactis, nonnunquam etiam liberis suberectis; foliis (partibus vaginae) oblonge ovalibus, usque ad 14.5 cm. longis et media in parte 2.5 cm. latis; 7—11 nervos (singulorum foliorum) continentibus.*

On this species I will here make only a few short remarks, as full details will be given later on.

a. It is very closely allied to *Schizoneura paradoxa*, Sch. M.,† the only difference being that our species has the portions of the vagina broader and has therefore more veins (indicating the leaflets which by their coalescence have formed the vagina).

b. As in *Schizoneura paradoxa* the portions of the spathe are sometimes found burst into the original leaflets: and thus we find it in our Raniganj species, but more frequently with only the apex of the spathe split as indication to further bursting; in our figures two leaflets (figs. 1 and 2.) exhibit this state, and on a future occasion I will illustrate this further.

c. *Schizoneura paradoxa* is a typically Triassic fossil. We may, therefore, consider our species also as Triassic.

d. The Damuda species is not different from that in the Panchet group, which latter I have also designated *Schizon. Gondwanensis*.§

e. It occurs, therefore, in both members of the lower portion of the Gondwana system, and from this circumstance I derived the specific name.

f. No *Schizoneura* is as yet known from Australia|| with certainty, and to consider the genus *Zeugophyllites*, Bgt.,¶ as *Schizoneura*, as Messrs. T. Oldham\*\* and H. F. Blanford†† have done, would be merely a supposition, as every one must recognise at once and that very easily the great difference between these two fossils. It is also incorrect to consider, as Mr. W. T. Blanford‡‡ has done, the Australian *Nöggerathia* as ? *Schizoneura*, the two latter genera being quite as distinct as the two

\* I give here only 3 little figures as all the other specimens will be figured in the Flora of the Damuda Series in the *Palacontologia Indica*.

† *Foliifero*.

‡ L. c. pp. 50, 51. Pls. XXIV—XXVI.

§ R. G. S. Ind. IX. 3. p. 66.

|| I mean from the lower coal-measures, in which marine fossils predominate.

¶ Prodrôme 1828, pp. 118-121; Streleczki, Phys. Descript. of New South-Wales,

1845.

\*\* M. Geol. S. Ind. II, p. 327.

†† Q. J. G. Soc. 1875, p. 527.

‡‡ Rec. G. S. Ind. IX, 3.





former are from one another; and I think certainly that Mr. W. B. Clarke would be able to distinguish a *Nöggerathia* from a *Schizoneura* or *vice versa*.\*

My opinion about the Australian *Zeugophyllites* is that it is rather a *Zamia*, as it differs in its chief characters from *Schizoneura*.

This latter has, owing to the coalescence of the leaflets into a common spathe, or after the dehiscence of the one spathe into two portions, much thicker veins, the representatives of the midribs of the originally separate leaflets, and the veins are also much more distant and all of equal thickness, while *Zeugophyllites*† has many more veins, which are the venation of the leaf itself, this being plainly rather a single leaf than the result of the coalescence of several leaflets.‡

I would consider it as belonging to the genus *Zamites*, Bgt., or perhaps also to some of the *Podozamites*; these genera are all meozoic.

In a paper by Mr. Bronn on the Triassic flora of the Raibler Schiefer,§ on pl. vii. fig. 4, is figured a specimen which is tolerably like the Australian *Zeugophyllites*, only that the veins are a little thicker.

*Schizoneura* and *Zeugophyllites* are therefore substantially quite different, the latter being a single leaf, the former having leaves formed by coalescence of several leaflets.||

*Schizoneura* is especially known from the Raniganj field, Jheria coalfield, but almost in the same abundance also from the Nerbudda valley (upper Denwa valley near Barkundum). In the flora of the Damúda group many specimens of this genus will be figured.

#### Genus *Phyllothea*, Bgt. 1828.

1828, Brongniart Prodrôme, 1828, p. 151.

The systematic position of this genus is, as I think, in the *Equisetaceae*, as the leaf-spathe plainly indicates. I do not see anything uncertain about it.

The most characteristic forms of this genus are known from the Italian Oolite.

\* From specimens which I have seen from Australia I have satisfied myself that the Australian *Nöggerathia* is certainly a *Nöggerathia* in the same sense as *Nögg. Hislopi*, Bunb. Schimper considers *Zeugophyllites* to be a *Cycadeaceae*.

† In my note on the Damuda Flora, R. G. S. India, IX. 3, p. 69, 4 lines from below, after the words "seem to belong also to *Schizoneura*" the words "according to Mr. Oldham" have been omitted, as can be seen from the following sentence, wherein I plainly say "that I do not know anything like *Schizoneura* from the lower coal-strata in Australia."

‡ Streleczyki, l. c. p. 250, Pl. VI, f. 5.

§ N. Jahrb. f. Min. etc. 1858.

|| Dana (U. S. Explor. Exped., Geology, p. 715) refers *Zeugophyllites* to *Nöggerathia*.





The first specimen was described by Ad. Brongniart,\* from Australia; it was the *Phyllothea australis*, Bgt.; later, Mr. McCoy added the *Phylloth. ramosa* and *Ph. Hookeri*,† which, however, seem not to be different. Subsequently Sir Ch. Bunbury described the *Phylloth. indica* from the Nagpur District,‡ and later still Mr. de Zigno§ described complete specimens from Italian Oolite.

No forms like these are known from true coal-measures anywhere.

This genus has, therefore, its analogues as well in the upper Australian coal-measures as in the Italian Oolite.

The Australian *Phyllothea* resembles the Italian forms most wonderfully.

From India the real *Phyllothea indica*, Bunb., was formerly only known from the Kamthi group|| (Nagpúr district).

But only lately I succeeded in discovering a specimen of *Phyllothea*, Bgt., in the real sense in our Raniganj collection; it is identical with the Kamthi species, and is further evidence that both these groups belong to the same horizon.

Although our *Phyllothea* at first sight seem very near some from Australia, they are yet distinct from them in the mode of formation of the leaf-spathe in the *articula*; our specimens having generally much thinner, and therefore more numerous leaflets, which are not grown together into so long a tube (spathe) as in some of the Australian specimens, the leaflets of which are generally broader: in which respect they agree more with those from Italy: the spathe is also longer.

#### INCERTÆ SEDIS.

Genus *Vertebraria*, Royle, 1839.

Pl. XV, Fig. 3, and Pl. XVI, Fig. 4.

Amongst Mr. Wood-Mason's specimens is also numerously represented that form which is so common throughout the whole Damúda Series, and which was first called by Royle *Vertebraria*, but the true nature of which has not been satisfactorily made out to date.

Dr. Royle¶ mentions this fossil only, without any description. He distinguished two species, which I do not consider to be different. The one called *Vertebr. indica* is the more common type.

\* Prodrome 1828, pp. 175, 152.

† A. and M. N. H. 1847, pp. 155-157.

‡ Q. J. G. Soc. XVII. p. 355, Pls. X. XI.

§ Flor. form. Oolith. 1856—1868. (Only these fascicles are in my hands.)

|| Most of the other specimens which are mentioned from elsewhere as *Phyllothea*, especially from the Raniganj field, and which represent mostly stalks and stems, belong, as I think, to the genus *Schizoneura*, Schimp., as stem portions, the real *Phyllothea*, Bgt., being rather rare.

¶ Illustr. Bot. etc. Him. Mount. 1839, p. 29. Pl. II. 1. 2. 3. 4. 5.





The first discussion of this genus we find in McCoy's paper on the fossil botany and zoology, &c. of Australia,\* wherein the author especially describes *Vertebr. Australis*, McCoy, which is something like Royle's *Vertebraria radiata* from India. But as both species were founded on very insufficient materials, and as the figure in McCoy's paper is the only existing one, it would be rather hazardous to draw any conclusions; and yet generally the Australian *Vertebraria* has both by Mr. Oldham and by Mr. W. T. Blanford been taken as identical with our Indian one.†

McCoy considered his specimen to be very near to the genus *Sphenophyllum* as a form with very short internodia, so that the leaf-whorls are very approximate. It is true that it looks at first sight a little like it, but I think it to be altogether an accidental preservation of the common form.

From this consideration Mr. Unger quoted the forms of *Vertebraria* as *Sphenophyllum*; and from this consideration of McCoy and determination of Unger I think it has happened that there is mentioned from Australia also the genus *Sphenophyllum*, no specimens of which have ever been described or figured from that country.

The next discussion of *Vertebraria* is to be found in Bunbury's paper on the fossil flora of Nagpúr,‡ wherein the author speaks especially of his figure 1. c., Pl. XI. 3, of which he plainly says that it cannot be either *Sphenophyllum* or any one of the *Asterophyllitaceae*, but that it appears to him rather to be the roots of some large plants, and so he concludes—

“On the whole, then, I am of opinion that the branched specimens from Kamthi, which have been taken for *Vertebraria* were the roots of some plants, possibly of *Phyllothea*,§ Bgt., that they had probably a woody central axis of small diameter, that between this axis and the outer coat or rind there was a hollow, traversed at irregular distances by incomplete partitions, which connected the outer coat with the axis.

“The unbranched specimens were most likely also fragments of root, though it is not quite so clear.” This is the extent of our knowledge of this peculiar genus.

I think I will presently be able to make some further remarks about this genus, especially about the unbranched form. Such specimens are well represented in Mr. Wood-Mason's collection; they are mostly pretty large, but some of them are branched too, but in a way other than in the specimen discussed by Sir Charles Bunbury.

\* A. and M. N. H. Vol. 20, 1847, pp. 145-147.

† I have a good, pretty large specimen of *Vertebraria* from Australia (Bowenfels upper coal-measures) before me which is totally different from our forms. As yet *Vertebraria* is quoted only from the upper coal-strata.

‡ Q. J. G. Soc. XVII, p. 338.

§ In Nagpúr it is very likely so, as there *Phyllothea* (in the true sense) occurs plentifully, while in the Raniganj field it can belong to another genus.





The most instructive specimen is that which I have figured (pl. xv, fig. 3.), and it will be sufficient first to discuss this.

It represents a thickish stem with a branch passing out of it.

The stem appears at first sight to be of the same kind as Royle's\* *Vertebraria indica*, but our specimen has the "middle axis," if one can so call it, broader. The whole stem shows the seemingly irregularly disposed 'breakings' on both sides of the axis, but a closer inspection shows that they are not so irregular.

The only difficulty of observation is that the specimens are generally very much crushed and have the outer coat destroyed, but the one under discussion is better preserved than most others.

The most important point about this specimen is that the whole surface is regularly longitudinally ribbed, in the same manner as the fossil *Calamites* or *Equisetum*; the ribs are rather broad, on the average about 2 mm., and are separated by thick lines (or very thin ribs, as one may call them), in the same way as is seen in some *Calamites* of the coal-measures.

The ribs are in general continuous over a long portion of the stem, but on some of the 'breakings' there are apparently interruptions of the ribs; the ribs ending regularly in the 'breaking' and the next ribs beginning again independently.

This reminds one very closely of the formation of an articulation in a *Calamites* or, indeed, in the *Equisetaceae* in general, and I consider it as representing an articulation. Our figure (pl. xv, fig. 3, a. a. a.) exhibits these relations very well.

So far they would agree completely with *Calamites* or *Equisetum*, and as regards the breadth of the ribs, mostly with some of the Triassic forms.

In these articulations the ribs do not alternate, as they generally do in the carboniferous *Calamites*,† but are arranged as they almost always are in the Triassic forms.

From what I have said about this stem, I am quite certain that it belongs to the *Equisetaceae* or at least to some order in which the *Calamites* must be placed; which is shown by the ribbed surface and by the articulations. But how to explain the 'breakings' of the stems? They are not so irregular as they seem to be at first sight. One thing is certain, that the articulations which I have observed on our specimen are just in the 'breakings'; perhaps this genus was very fragile at the articulations; but Sir Charles Bunbury's hypothesis could be right too.

Yet another circumstance must be mentioned, which is of importance and could partly explain the 'breakings'. Our specimen is also branched;

\* l. c. Pl. 2. f. 1.

† In the true Carboniferous I know of only one instance where the ribs do not alternate; it is in the coal formation of Silesia.



but the branch does not grow out from the body of the stem, being inserted in an articulation, or at least in a 'breaking', and being joined to the main stem by an articulating surface (pl. xv, fig. 3, b.) in the same way as in *Calamites*, and in the *Equiseta*, fossil and living. The branch shows the same structure as the main stem, a central axis (?), the 'breakings,' and the striation of the surface.

I suppose this insertion of branches by a special articulation could produce in a certain way of preservation foldings or breakings similar to those seen in this specimen.

But still something must be considered. It is known that the rhizomes in living *Equiseta* are constructed in nearly the same way as the stems above the surface, but that, when they dry, they contract and shrink in different degrees. Our specimen could very easily represent such a state of things.

Another specimen of importance is that figured on pl. xvi, fig. 4.

It is a thin, compressed stem, which is preserved with the surface, as no axis is visible, but the characteristic 'breakings' and contractions are pretty well marked, so that nobody can deny its being a true *Vertebraria*, Royle; but what is interesting in this specimen is, that the 'breakings' and contractions are quite regular, corresponding with the articula and internodes of equisetaceous plants. One can count 9 internodes and therefore 8 articula, which are pretty much of the same length. The articula are well marked by a constriction and a 'breaking' in both adjoining internodes.

The surface is smooth, but on the right side (of the figure) of the original specimen are seen in all the internodes several ribs, which seem to be interrupted in the place of the constriction, and thus to form an articulation similar to that which I have already described in the other specimen.

I can therefore draw, as regards the specimens before me, the following conclusions:

1. *Vertebraria* was most probably the rhizome of a certain equisetaceous plant.

2. This is rendered probable by its very frequent occurrence throughout all the strata of the Damuda series in an almost unaltered appearance—further by the regular striation or ribbing of the surface and the partially preserved articulation.

3. Some of the "breakings" may have been produced by the insertion of branches in the articulations.

4. What now about the relations? there we are obliged to suppose that they belonged to some frequent plants. Here in Raniganj it is very easy to find the connection, where other equisetaceous plants are so frequent, especially *Schizoneura*, Schimp, to which most of the stems known here as *Phyllothea* belong, as I think, as stalks above the surface.



We should therefore have *Vertebraria* as rhizome, *Phyllothea*\* (those stems which are called by this name) as stalks, and *Schizoneura* as the leaved branches of one and the same plant.

5. But I think *Vertebraria* could have belonged as rhizome also to some other plants of other genera or species, and in the Raniganj field it could have belonged also to *Sphenophyllum*, in the Kamthis to the *Phyllothea indica* (the real *Phyllothea*).

6. In Australia, in the upper coal-strata, this genus belonged certainly to *Phyllothea* too, as it is always associated with it, and no other Equisetaceous plant has hitherto been found with it.

7. But in some localities we do not find it associated with any plant to which it could be referred; which, however, is no proof against the suppositions I have just made.

Besides these complete specimens of *Vertebraria*, a specimen is in Mr. Wood-Mason's collection which more resembles that described by Sir Charles Bunbury: it is a branching specimen, which in reality seems to be a rootlet, as Sir Ch. Bunbury explained it; I have given a figure of it on pl. xv, fig. 4.

From other places we have better specimens of the same kind, in which the branching agrees exactly with Sir Charles Bunbury's description; and I will describe them hereafter.

The following table is given to illustrate the occurrence of Equisetaceæ in the Raniganj field:—

\* The real *Phyllothea* with a closed leaf-spathe is a peculiar genus.



## III. GENERAL VIEW OF THE EQUISETACEÆ IN THE RANIGANJ FIELD.

| Names of the Species<br>from Raniganj field.        | Where in<br>other portions<br>of the Damú-<br>das.                                                 | Europe.                                                            |                          | Australia.                                                                                                                                                                                                                                                 |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     |                                                                                                    | Trias.                                                             | Jura.                    |                                                                                                                                                                                                                                                            |
| Class EQUISETACEÆ.<br>Order I. <i>Equisetaceæ</i> . |                                                                                                    |                                                                    |                          |                                                                                                                                                                                                                                                            |
| <i>Schizoneura Gondwanensis</i> ,<br>Fstm.          | Jherria coal-<br>field.<br>Danwa val-<br>ley.<br>Very frequent<br>also in the<br>Panchet<br>group. | Genus : lower<br>Trias in the<br>Vosges.<br>Keuper at<br>Stuttgart |                          |                                                                                                                                                                                                                                                            |
| <i>Phyllothea indica</i> , Bunb....                 | Kamthi Beds<br>(Nagpur dis-<br>trict.)                                                             | ....                                                               | Genus (real) :<br>Italy. | Genus in the up-<br>per coal-beds<br>in New South-<br>Wales; the<br>same species<br>also in Victo-<br>ria, here with<br><i>Taeniopteris</i><br><i>Daintreei</i> , Mc-<br>Coy, which in<br>Queensland is<br>characteristic<br>of the mezozoic<br>formation. |
| <i>Vertebraria indica</i> , Royle....               | In all por-<br>tions.                                                                              | ....                                                               | ....                     | Genus in Aus-<br>tralia.                                                                                                                                                                                                                                   |
| Order II. <i>Calamariæ</i> .                        |                                                                                                    |                                                                    |                          |                                                                                                                                                                                                                                                            |
| <i>Sphenophyllum trizygia</i> ,<br>Ung.             | In the Bará-<br>kár group<br>at Talchir<br>in Orissa.                                              | ....                                                               | ....                     | From Australia I<br>have never seen<br>a figure or any<br>description.                                                                                                                                                                                     |

## II. FILICES.

The remains of ferns in the Damudas in general, and in the Raniganj beds in particular, were up to this time no rarity, on the contrary they occurred pretty frequently as regards specimens, but as regards variety of forms they must be considered to have been very poorly represented.



For only the genus *Glossopteris* occurred at all frequently, and this was the only fern formerly regarded as of any importance, because the other forms were of rarer occurrence.

But now we know that even amongst the older collections were other forms of importance, to which last year two others were added from Kurhurbali; and this year Mr. Wood-Mason has added a good number of interesting forms, all of which bear a mezozoic habitus, *Tæniopteris*-like forms and ferns with net-venation predominating.

The studies and works of the most illustrious palæontologists have shewn that the floras of the different epochs have in general special and distinctive characters, although these may not be so strictly limited as in the faunas, and although transitional forms are very often met with.

Thus we know that the coal-period in Europe and America, and the real lower coal-measures in Australia (Port Steffens, Smith's Creek, etc.), have their own flora, which is characterized by certain *Equisetaceæ*, and amongst ferns especially by the *Sphenopterides*, true *Neuropterides*, prevalent *Alethopterides*, *Lepidodendron*, *Cyclostigma*, *Sigillaria*, *Stigmaria*, etc. Forms with net-venation are rare, the true *Dictyopteris* and *Lonchopteris* being nearly the only forms of this kind and *Tæniopteris* being rare.

The mezozoic epoch, however, is especially marked by these forms with net-venation—forms generally different from the genera mentioned above from the true carboniferous: we find *Sagenopteris*, *Cheiropteris*, *Olathropteris*, *Camptopteris*, *Gangamopteris*; more numerous *Cycadeaceæ*; frequently the order *Tæniopterides*, of different types; amongst the *Pecopterides* we find certain forms, of which many can be united into one group, of which *Alethopteris Whitbyensis*, Göpp., may be taken as the chief representative; and we find on the whole more numerous forms allied to living genera.

This, however, does not exclude the possibility of a genus like *Glossopteris* having existed in Australia at a time when carboniferous marine animals lived.

The ferns which Mr. Wood-Mason has brought are for the most part of such a nature that one can point with probability to their living allies.

I will not here speak more in detail of the ferns, as I have entered fully into the subject in my Kach and Rajmahal flora in the 'Palæontologia Indica,' and will only indicate the palæontological order of ferns, in which I will discuss them; the best and latest system is to be found in Schimper's 'Palæontologie végétale' and is as follows:—

- Order I.—*Sphenopterides*.
- „ II.—*Neuropterides*.
- „ III.—*Pecopterides*.
- „ IV.—*Tæniopterides*.
- „ V.—*Dictyopterides*.
- Genera adhuc viventia, etc.



Of these last I mention here only the order *Gleicheniaceae*, which is represented in the Rajmahal Hills.

Of these orders, I, III, IV, and V, are represented frequently enough amongst our Raniganj fossils, if we consider that the mezozoic epoch as a whole, especially the Trias, was rather poor in ferns, much poorer than the palaeozoic epoch; we see, in Europe, that in the Trias, in comparison with the Permian and Carboniferous rocks, the forms are rather rarely represented. And so it is in India; and I think this circumstance, that is to say, the poverty in variety of forms, together with the very frequent occurrence of the genus *Schizoneura* and such characteristic fossils as a single pinnate *Neuropteris* (which is a Triassic type), the genus *Voltzia* with 2 species, *Albertia*, etc., can be used with far greater effect to bring our Damuda flora into contrast with the palaeozoic flora, than the rarity of Cycads can to indicate a break between the lower and upper portion of the Gondwana system, both of which are closely allied by the mezozoic habitus of the flora in general.

In Australia the lower coal-measures with prevailing carboniferous marine animals must be taken as of that age, although some plants occur, which become more developed in the upper coal-measures, where only a flora is found which is not contrary to the supposition of a mezozoic age, although it cannot be well compared with our Damuda flora.

When I said that orders I, III, IV, and V, are especially represented amongst our ferns, I should have explained that these are only palaeontological orders, which, however, are as well founded on certain characters as the living ones.

Botanists, it is well known, use the fructification, besides the venation, as a chief character in establishing their orders and genera. The former, however, being rarely found in fossil plants, the palaeobotanist is obliged to use other constant characters, of which the venation and the shape of the leaf stand in the first place, and hence it is that in the same fossil genus (for instance, *Pecopteris*), we may find represented several living genera, which, however, cannot always be recognised, as only in a minority of specimens is the fructification preserved, while the typical venation of the genus *Pecopteris* will always be found indicated. The same we find amongst the *Tacniopterides*, *Dictyopterides*, etc.

Mr. Ettingshausen\* published in 1865 a valuable work on living ferns, which is written for the special purpose of showing to what living types fossil ferns can be referred or which living forms are analogues of the fossil ones. In the present paper I shall have occasion to refer several times to this work.

\* Die Farrenkräuter der Jetztwelt etc. nach dem Flächenskelet bearbeitet; Wien 1865.



## Order SPHENOPTERIDES (em.)

This order is especially developed in the carboniferous epoch, where we find forms with leaflets and fronds of the most different shapes.

The following genera have been distinguished—

*Sphenopteris*, Bgt.

*Hymenophyllites*, Bgt.

*Trichomanites*, Bgt.

*Schizopteris*, Bgt.

But there is no great difference between *Hymenophyllites* and *Trichomanites*, and we already find in Mr. Geinitz's 'Steinkohlen Deutschlands' some *Trichomanites* ranged with *Hymenophyllites*, also *Schizopteris* placed with the *Sphenopterides*. With this I perfectly agree, as I will show further on.

D. Stur (in Vienna) for a long time considered *Schizopteris* as belonging to the *Neuropterideae*.

The *Sphenopterides* have as their analogues in the existing flora the genera *Gymnogramme*, *Notochlaena*, *Cheilanthes*, *Davallia*, *Dicksonia*, *Ancimia*, etc.

Schimper, in his 'Palæont. végét.', used these living affinities to form as many subgroups of *Sphenopteris* as there are names of living genera analogous to it, as follows:—

*Sphenopteris Gymnogrammides*.

*Sphenopteris Notochlaenides*.

*Sphenopteris Cheilanthides*.

*Sphenopteris Davallioides*, etc.

Everybody will acknowledge this to be very reasonable, but it has only this one fault, that one is not always able to distinguish all the characters by which a species should be ranged with a particular subgenus.

Schimper distinguishes also a *Sphenopteris Trichomanides* and *Hymenophyllides*, which, however, are not far from each other, and which are better ranged with *Hymenophyllites*, Göpp.

For *Schizopteris* he establishes a new genus *Rhacophyllum*, as also separates some types formerly referred to *Sphenopteris* and places them in a new genus *Rhacopteris*, Schimp.

But some of these are certainly *Sphenopteris*, although Mr. Stur in a recent paper\* again uses this name and places it with the *Ophioglossae*. I, however, think it is much better to keep them with *Sphenopteris* too, and, following Mr. Schimper, to make a special subgroup of *Sphenopteris*, as they show a great affinity with this fossil genus and one otherwise would consequently have to place all the others in the living families also.

\* Culmflora des Mährisch-Schlesischen Dachschiefers, Abh. der K. K. Geol. Reichsanstalt in Wien, 1875.



These have nothing to do with the *Ophioglosseae*; I would mention only the two carboniferous\* species, *Rhacopteris Asplenites* and *Rhacopteris Rakonitzensis*, Stur; the former is a real *Sphenopteris*, the other is certainly a *Zamia* belonging to the genus *Nöggerathia* and has already been described as *Nöggerathia intermedia*, K. Fstm.

Some of those, however, which are placed in *Rhacopteris* with the other types of *Sphenopteris* are indeed different, and they should never be placed with them; they may have their affinities in the *Ophioglosseae*, as I will show especially on some specimens from Australia from the real lower coal-measures which certainly resemble *Botrychium* in the shape of the leaves.

From the Raniganj coal-field no *Sphenopteris*† has as yet been described, and I have not met with any specimen with certainty. Amongst Wood-Mason's specimens, however, are several, which on a closer examination turn out to belong to this genus.

#### Genus *Sphenopteris*, Bgt. 1828.

- 1828. Brongniart, Hist. d. végét. foss.
- 1841. Göppert, Gatt. foss. Pfl. I. p. 67.
- 1850. Unger, Gen. et Spec. plant. foss.
- 1855. Genitz, Verst. der. Sächs. Steinkohlenf.
- 1869. Schimper, Pal. végét. I.
- 1873. Feistmantel, Zeitsch. d. D. g. Gesell. 502. seqq.\*
- 1876. Feistmantel, Rajm. Flora. in Pal. Indica.

#### *SPHENOPTERIS* POLYMORPHA, n. sp., Pls. XVI, Figs. 5—7 & XVII.

*Fronde tripinnata; rhachide primaria et secundaria late alata; pinnis alternantibus, sub angulo subrecto e rhachide primaria egredientibus; tota in fronde differentibus; superioribus semel pinnatis, pinnulis solum paulo sinuatis aut lobatis, alternantibus‡; mediis longioribus, etiam semel pinnatis, aut pinnulis distincte lobato-incisis; imis longissimis distincte bipinnatis,§ pinnulis pinnatis, longioribus; pinnulis earum pinnularum denticulatis; nervis pinnularum primariis e rhachide pinnarum egredientibus, nervos secundarios in lobos aut pinnulas (secundi ordinis) emittentibus, furcatis.*

There are several specimens, which gave me the idea of this form.

One specimen especially, portions of which are figured on pl. xvi, figs. 5—7 shows the characters of this form plainly.

\* From coal-measures in Bohemia.

† Mr. Oldham, Mem. Geol. Surv. Ind. II., p. 32, mentions, it is true, the genus *Sphenopteris*, but no species is named and no discussion nor any precise locality is given.

‡ So they are throughout.

§ Tota frons hoc modo tripinnata.



The upper portion of the frond (pl. xvi, fig. 5.) is only bipinnate, the pinnae have pinnulae which are only a little lobed; in the middle portion the pinnulae are longer and more deeply lobed, and we can call them pinnatifid; the lowest are the longest, and again distinctly pinnate, and these second pinnulae are again a little denticulated. The veins of the pinnulae pass out from the rhachis of the pinnae and send up the branches to the lobes or into the secondary pinnulae and there they are forked. The pinnulae have a peculiar arrangement on the pinna: only the lower ones begin with a pinnula in the angle of the chief rhachis and that of the pinnae, while of the upper ones the first is pretty distant from the chief rhachis.

Both the chief rhachis and the rhachis of the pinnae are broadly winged.

These three different states of the frond I observed in one case on one specimen, while in others I found them separated on different slabs. But with the assistance of that one specimen, all can be referred to the same species; from this different state of the pinnae and pinnulae in the several portions of the frond I have called the species "*polymorpha*."

Of the other specimens I have figured some portions on plate xvii which plainly show the various sizes and shapes of the pinnulae.

This fern has some analogies.

First I must mention McClelland's *Pecopteris affinis*, (Report Geol. Surv. Pl. XIII, Fig. 11 b.) As far as one can judge from the bad figure, there pass out from the rhachis of the pinna a pretty strong midrib into the pinnulae (of the first order), and from this midrib a secondary vein passes into each distinct lobe of the pinnula (indicating pinnulae of the second order), and here the secondary veins are forked. This agrees quite well with the character of the nervation in our *Sphenopteris polymorpha*, especially in the larger specimens, and I have no doubt but that this *Pecopteris affinis* of McClell. with great probability belongs to the same fern. The inspection of the original specimen, which will be later figured again, confirms my view.

Amongst other fossil ferns, our species can be compared in some way first with that form which was originally described as *Pecopteris alata*, Bgt.,\* from the Hawkesberry beds in Australia, but which later was ranged with *Sphenopteris*, and recently by Schimper with *Sphenopteris Hymenophyllides*, Schimp. Our species has in common with this the broadly winged rhachis and, besides this, the shape of the upper pinnae, but the lower pinnae cannot be compared with ours, the secondary pinnulae being not so denticulated. Both these species may in the younger states be pretty similar, while differing in the older ones.

The lower pinnulae of our fern resemble rather those of the *Pecopteris athyrioides*, Bgt.,† now *Sphenopteris athyrioides*, Bgt. sp., from the Yorkshire

\* Hist. d. végét. foss. p. 361, pl. 127.

† l. c. pl. 125, f. 3.



Oolite, only that this latter species has no winged rhachis. Thus, our fern presents some points of resemblance to mezozoic forms only, although it cannot be identified with any one of them.

The same species occurs also in the Barakur group at Talchir (Cuttack) in Orissa.

### Order PECOPTERIDES (æ.)

An order which is the most frequent in the whole fossil flora, but everywhere are represented certain types and forms which are characteristic of certain strata, although the relations of all to one another cannot be denied.

In the existing flora we find analogues of the fossil *Pecopterides* amongst the *Aspleniaceae*, *Aspidiaceae*, *Acrostichaceae*, and true *Pterides*; therefore in general amongst the *Polypodiaceae*, tribe *Polypodeae*. Only in cases where the fructification is preserved, can one determine the family more exactly; in other cases we can judge only from the venation and therefore only generally. By this proceeding of course it may sometimes happen that forms of the same living genus are taken in the fossil flora as different as long as the fructification is unknown; I may mention for instance the carboniferous *Alethopteris Serli*, Bgt., which is certainly a *Pteris*, and, again, *Lonchopteris rugosa*, Bgt., which in form closely resembles *Alethopteris Serli*, only that it has a net-venation; but we know that in the living genus *Pteris* the same relations obtain: for instance, *Pteris Schiedeana*, Presl., *Pt. comans*, Forst. *Pteris polyphylla*, Presl. have a net-venation, while *Pt. pseudolonchitis* Bory, *Pt. nemoralis*, Willd., and even the common *Pt. aquilina* and a great many others, have free and forked veins with a similar shape of the leaflets.

Mr. Ettingshausen in the above-mentioned work has attempted to distribute the fossil *Pecopterides* (as *Alethopteris*, *Pecopteris*, etc.) amongst the different living genera, as he fancied himself able to do from the venation.

The chief living genera in which Mr. Ettingshausen saw analogies to the fossil *Pecopterides* are shortly the following:—

#### PTERIS, Linn.

*Pteris Serli*, *Pecopteris Serli*, Bgt. (*Alethopteris*).

*Pt. lonchitica*, *Pecopt. lonchitica*, Bgt. (*Alethopteris*).

*Pt. Whitbyensis*, *Pecopt. Whitbyensis*, L. H. etc. (*Alethopteris*).

#### ASPLENIUM, Linn.

*Asplen. Radnizense*, *Pecopt. Radnizensis*, Stbg. sp. (*Cyatheites*).

*Aspl. simile*, *Pecopt. similis*, Stbg., etc.

#### PHEGOPTERIS.

*Phegopt. arguta*, *Pecopt. arguta*, Bgt. (*Cyatheites*).

#### ASPIDIUM.

*Asp. lanceolatum*, *Pecopt. lanceolata*, Stbg.

#### HEMITELIA.

Here are to be ranged most of the fossil *Cyatheides*, etc.



Mr. Schimper, in his 'Pal. végét.', endeavoured to establish a reasonable method, which, however, cannot always be used.

He kept the generic name *Pecopteris* and joined with it the name of the living genus to which he thought the fossil belonged to indicate a subgroup: thus, he has *Pecopteris Cyatheides*, *Pecopteris Aspidides*, etc.; but besides this, the peculiar genus *Alethopteris*, Göpp., which differs considerably from *Pecopteris*. But I think it is better to distinguish not only *Alethopteris*, Göpp., but the fossil genus *Cyatheites* also, and to range with *Pecopteris* only those forms which cannot be united with either of these two.

#### Genus *Alethopteris*, Sternberg, 1838.

*Fronde bi- vel tripinnata. Pinnulis plerumque integerrimis nonnunquam denticulatis tota basi adfixis, saepius basi dilatatis ac connatis, rarius subconstrictis, sed etiam connatis; marginē nonnunquam reflexo (soros obtegente?\*), nervo medio plus minusve distincto, ex rhachide egredientē usque ad apicem continuante, nervis secundiis sub angulo subacuto egredientibus, simplicibus, vel semel (superioribus) vel bis (inferioribus) furcatis, parallelis aut divergentibus†, ad marginem productis. (Fructificatio familiae).*

*Alethopteris* is represented in the existing flora especially by forms of the genus *Pteris*, *Phegopteris*, etc. Of *Pteris* I will mention the common *Pteris aquilina*, *Pteris arachnoidea*, Kaulf., *Pteris Smiethiana*, Prsl., *Pt. flabellata*, Thunb., etc.; of *Phegopteris*, *Phegopteris decussata*, Mett.

From the mezozoic epoch we find described a good number of species, which, however, when compared together show great likenesses as well in the shape of the leaflets as in the venation. This has been lately recognised and acknowledged by several authors.

*Alethopteris Whitbyensis*, Göpp., is the typical form to which a good many of the mezozoic forms can be referred, some of them being even identical with it, others very closely related.

Mr. Schimper (Pal. végét. I. 569) indicated this by speaking of a group of *Alethopt. Whitbyensis*, Göpp.,‡ to which many species were referred.

\* In this case the form agrees with *Pteris*.

† In my Flora of Kach (Pal. Ind. XI, No. 1, 187, p. 22), when giving the diagnosis of *Alethopteris*, I said only "divergentibus," whereas I should have said "parallelis aut divergentibus."

‡ When speaking of *Alethopt. Australis*, Morr., Schimper says: "Cette fougère appartient au groupe de l'*Alethopt. Whitbyensis*, Göpp., groupe qui paraît être propre au terrain jurassique."



In my Flora of Kach (Pal. Ind. XI, pt. 1, p. 22), I also speak of a group of *Alethopteris Whitbyensis*, Göpp. (Lindl. and Hutt.), and on p. 27 enumerate all the species which I think can be brought into any connection with it.

Of our Indian fossils are to be placed here *Alethopt. Whitbyensis*, Göpp. (*Alethopteris tenuis*, Bgt. sp.), *Alethopteris indica*, O. M., *Alethopteris Lindleyana*, Royle sp. M. Saprota\* has re-established for all these mezozoic forms the genus *Cladophlebis*, with which they are to be ranged, and this author has a *Cladophlebis Whitbyensis*, *Cladoph. Rösserti*, etc., both of which latter he considers as scarcely distinguishable; so that I was right when I placed the *Alethopt. indica*, O. M., the near relationship of which to *Alethopt. Rösserti*, Schenk, cannot be denied, in the group of *Alethopt. Whitbyensis*.

Group of *Alethopteris Whitbyensis*† (Schimper 1869, Feistmantel 1876.)

Of Mr. Wood-Mason's specimens one belongs here.

ALETHOPTERIS LINDLEYANA, Royle sp., Pl. XX, Fig. 7.

1869. *Pecopteris Lindleyana*, Royle, Illustr. Bot. etc. Him. Mount. Tab. 2, f. 4.  
 1849—50. ———— McClelland, Rep. Geol. S. India, Pl. XIII. f. 10. a. b. c.  
 1845. ———— Unger, Synopsis Plant. foss. 96.  
 1850. ———— Unger, Genera et Species Plant. foss. p. 171.  
 1861. ———— Schimper, Pal. végét. I. p. 568.  
 1876. ———— Feistmantel, Rec. G. S. Ind. IX. 3. p. 76.

*Fronde bi-pinnata; pinnis patentibus, rhachide eorum crassiore; pinnulis tota basi sessilibus, attingentibus, oblonge-ovalibus, margine integris aut sinuatis; nervo medio usque ad apicem excurrente nervis secundariis angulo subacuto egredientibus dichotomis; sporangiis ramis insidentibus.* (Feistmantel ex parte).

Royle was the first to figure this species; but he has given no description; his specimen, too, could not have been a well-preserved one, but it gives at any rate the form of the leaflets.

In McClelland's Report (l. c.) we find added three figures more, which, however, are very badly drawn, as also is his *Pecopteris affinis* (l. c. Pl. XIII. Fig. 11. a. b.), of which fig. 11 must certainly be placed with *Alethopteris Lindleyana*, Royle, while fig. 11 a. is a bad representation of the same fern of which I give figures on pls. xvi. and xvii, and which, as I think, belongs to another type of plants, and I have described it amongst the *Sphenopterides*. The worst thing in McClelland's figures is the veins in the leaflets, which are quite unnatural. So it is also with his figures of *Alethopt. (Pecopt.) Lindleyana*, Royle.

\* Pal. Francaise, Végét. fossiles, Jurassiques et Triasiques, p. 298 et seq.

† *Cladophlebis*, Saprota, Pal. Franc. Veg. foss. Jur. 298.





We can, however, still recognize that we have to deal with an *Alethopteris*, Göpp., as some of the originals are still in the Museum of the Geological Survey.

Mr. Oldham\* from the first compared this *Alethopteris Lindleyana*, Royle, with *Pecopteris Australis*, McCoy. I think there is an analogy in so far as they both belong to the same mezozoic group.

Schimper has recently† described this species as *Alethopteris Lindleyana*, Royle, between *Aleth. indica*, O. M. and *Alethopt. australis*, Morr., and says of it (p. 569), "*Cette espèce paraît également appartenir au group de l'Alethopteris Whitbyensis*, etc."

The figures of Royle and McClelland were all taken from sterile fronds. Amongst Mr. Wood-Mason's specimens is a fructifying pinna, which in the form of the leaflet agrees perfectly with that of *Pecopt. Lindleyana*, Royle (l. c.), so that I do not doubt but that I have this species before me, and I must consider it as a fertile frond of *Pecopteris Lindleyana*, R.

It is only a fragment of a pinna with 4 pinnulæ on each side. The form of the leaflets besides agreeing with Royle's figure (l. c.) shows also a similarity to certain forms from the Rajmahal Hills which I consider to belong to the *Alethopteris indica*, O. M., and of which one specimen will be figured on Pl. XXXVI of the continuation of the Rajmahal Flora, now in the press and shortly to be issued.

The specimen under discussion is the second instance of a fern found in fructification in the Raniganj field‡; fructifying ferns are as yet very rare, and we know besides these two specimens only *Glossopteris indica*, Schimp., from Kamti (Nagpûr district) with fructifications preserved.

The rhachis of the pinna is pretty thick, the pinnulæ broadly ovate, connected at the base, with a slightly waved margin.

The chief veins fine, as also are the secondary ones, which seem forked; the sporanges inserted on the secondary veins, on the surface of the pinnula, about midway between the midrib and the margin.

There are generally from six to eight sori in each row.

From the manner of fructification and from the shape of the leaflets, we could perhaps trace an analogy between our species and some forms of the genus *Polypodium*, perhaps *Polypodium spectabile*, Sprengel (Kaulf.), *Polypodium concinnum*, Presl. (and others), *Polypodium submarginale*, Sprengel, *Polypodium amplum*, Presl., and other species. (Some of these are also described as *Phegopteris*.)

\* Mem. G. S. Ind. Vol. II. p. 328.

† Pal. veget. I. pp. 568, 569.

‡ A fructifying pinnula, as I suppose, also of *Alethopteris (Pecopt.) Lindleyana* is amongst McClelland's originals, but was never mentioned.



Amongst fossils the non-fructificating frond can be compared, as I have said, with some fronds of our *Alethopteris indica*, O. M., from the Rajmahal Hills.

**ALETHOPTERIS comp. WHITBYENSIS**, Göpp., Pl. XXI, Figs. 6, 6a.

Two pinnulæ of a fern which I can only place with this species, as they are so near that I do not think it advisable to separate them.

Our pinnulæ are more closely allied to Brongniart's *Pecopteris tenuis*,\* from the Yorkshire Oolites; but in my Kach Flora† I have shown all the species which are synonymous with or related to this *Alethopt. Whitbyensis*, Göpp., and amongst them *Pecopt. tenuis*, Bgt., is the first. There is nothing peculiar in the occurrence of this species in our Raniganj Series, since we know that the fossils of this group are more closely related to one another than was formerly thought, and since Saporta‡ has shown that this *Cladophlebis Whitbyensis*, Göpp., and *Cladophlebis Rösserti*, Schimp., (a Rhætic form) are almost identical. To the *Pecopt. Rösserti* (*Cladophlebis*) our *Alethopt. indica*, O. M., from the Rajmahals is very closely allied, and to this latter again the *Alethopt. Lindleyana*, Royle sp., of the Raniganj Series; and now we have the *Pecopt. tenuis*, Bgt., identical with the *Alethopt. Whitbyensis*, Göpp.

Type *Phegopteris*, Mett.

There is a very big specimen of a fern which from a palæontological point of view is an *Alethopteris*. But a closer examination shows that the specimen has a very close relation in the existing flora, and it is amongst the *Aspidiaceae* with single secondary veins.

There is the genus *Phegopteris*, which is in some forms almost identical with our fossil, our *Alethopteris* agreeing especially with *Phegopteris decussata*, Mett. I could at once establish on this specimen this living genus in the fossil flora, but in conformity with the palæontological classification, I retain the generic name *Alethopteris*, using *Phegopteris* to form the specific name, and placing this new species in the type *Phegopteris*. This fossil is, therefore, especially of interest as so closely resembling a living genus; but there are some differences, as we shall see in discussing the species.

**ALETHOPTERIS PHEGOPTEROIDES**, n. sp., Pl. XVIII.

*Fronde valida, bipinnata; rhachide crassa, punctulata; pinnis sub angulo subrecto e rhachide egredientibus, rhachide earum crassiore; pinnis mediis longissimis basin apicemque versus attenuantibus; pinnulis oblon-*

\* Hist. d. végét. foss. Pl. 110. f. 3. 4.

† Kach flora in Pal. Indica, Ser. XI. 1. 1876. pp. 22—25.

‡ Végét. foss. Terr. Jur. de France, p. 298 et seqq.



*gis incurvatis maxime approximatis, omnibus aequalibus oblique insertis, primis solum verticaliter adfixis et paulo latioribus, omnibus ad bases connatis; nervo primario pinnularum distincto ad apicem promotum; nervis secundariis singulis sub angulo acuto egredientibus. Fructificatione non obvia.*

A big slab of shale contains two fronds, besides smaller fragments, of this interesting fern.

The chief characters which are to be observed are in the pinnulae; these are oblong, closely set, a little incurved and oblique to the rhachis of the pinna, only the first pinnulae near the chief rhachis being vertically inserted, and a little broader than the others, so that they are distant from them; the midrib is pretty thick and reaches to the apex; the secondary veins are single, passing out at an acute angle from the midrib; the lowest two in that portion of the pinnula which is directed from the chief rhachis are arcuate, the rest being quite straight.

The pinnae are longest in the middle of the frond and are shorter at base and towards the apex. The chief rhachis pretty thick.

I have figured two portions of the specimen; one of them shows two pinnae, which are entire, with the end leaflets. Two other figures illustrate the disposition of the veins and the bases of the pinnulae and the top portion.

From this we see plainly the relation with the *Aspidiaceae* and especially with *Pheopteris*, of which *Pheopteris decussata* is the nearest.

One sees well in our specimen the triangular empty spaces between adjoining pinnulae, where these are connected: these contain no veins.

This type of fossil is quite peculiar, and I do not know any form in the palaeozoic strata at all analogous to it.

But on the other hand there is in the Trias a form which was first described as *Pecopt. Stuttgardensis*, Bgt.,\* but later by Schimper† was placed in a new genus *Lepidopteris* (in the *Pecopterides*).

On Brongniart's figure, which, however, is not quite distinct, one sees very distinctly the single veins arranged in a similar way to our specimen, but I think the shape of the leaflets is different, as they are a little longer and not so incurved, and they are also more deeply separated, but I do not know if the punctuation of the rhachis can be considered as a sufficient character, as all ferns present it more or less.

Into this genus *Lepidopteris*, Schimper placed also the rhætic form, *Asplenites Ottonis*, Schenk, as *Lepidopt. Ottonis*, Schimp., of which we find near relations amongst the Rajmahal fossil plants.

I think the *Pecopteris arguta*, Bgt.,‡ from the coal-measures, belongs

\* Histoire d. végét. fossiles, 1820, Pl. 130, f. 1.

† Pal. végét. I. p. 572, Pl. XXXIV. f. 1.

‡ Brongniart, Hist. d. végét. foss. Pl. 108, f. 3. 4.



to the same type of fossils, but our species is much more nearly allied to the living *Phegopteris* than to any fossil species,

### Order TÆNIOPTERIDES.

In my preliminary 'Note on the Flora of the Damuda Series'\* I have already pointed out that the Damúdas are by no means without a *Taeniopteris*, but that, on the contrary, forms of this order had been known for several years from these rocks; they occur especially in the Kamthi and Raniganj groups (both of which, however, are of the same horizon), and also in the Barakur group.

The majority of the *Taeniopterides* belong, as we know, to post-palæozoic epochs, the mezozoic epoch being especially rich in species of this order. There are, it is true, some forms in the Permian formation, but these are very rare and scarcely of any importance, while in the mezozoic they are frequent.

In the occurrence of this genus in the Damúdas, I see a connecting link between the lower and upper Gondwanas, as in these latter (Rajmahal Series) analogous forms are very frequent.

Brongniart† knew only the one genus *Taeniopteris*, but since his day other discoveries have been made, so that Schimper in his 'Palæont. végét.' could give a pretty complete division of this order.

In my Kach flora‡ I have given a close discussion of this order and need therefore only shortly indicate here Schimper's division; he distinguishes:—

1. *Taeniopteris*, which he restricts to the few palæozoic forms.
2. *Macrotaeniopteris*, Schimp. especially mezozoic forms; of Indian specimens belong here the greatest part of the broad-leaved forms from the Rajmahal Hills and besides these some forms from the Kamthi, Raniganj, and Barakur groups.
3. *Angiopteridium*, Schimp., a mezozoic type, to which especially some of the Rajmahal species belong and perhaps one from the Kamthis.
4. *Oleandridium*, Schimp., begins in the mezozoic epoch. We have one species from Kach.
5. *Danaeopsis*, a Triassic form, but here found, as I think, in the Liassic Rajmahal group.

*Marattiopsis*, Sch., and *Danaeides*, Schimp., are of no interest for us. From this division the living affinities are plainly seen, and they particularly are—

*Aspidium Nidus* for *Macrotaeniopteris*.

*Angiopteris* for *Angiopteridium*.

\* Rec. Geol. Surv. IX. 3. p. 74.

† Prodrome and Histoire, 1828.

‡ Pal. indica, XI. 1. 1876.





*Oleandra* for *Oleandridium*.

*Danaea* for *Danaeopsis*, Heer.

From our Raniganj Series we have to deal only with *Macrotaeniopteris*.

Genus **Macrotaeniopteris**, Schimper, 1869.

Schimper, Palaeontol. végét. I. p. 610.

*Frondibus simplicibus, speciosissimis, plus minus elongato, obovatis, obtusis vel acuminatis nonnunquam etiam apice emarginatis, integris, raro irregulariter pinnatifissis, interdumque denticulatis. (Fructificatione Aspidiacearum, Schimp.)*

With this genus Mr. Schimper placed all the broad-leaved mezozoic forms which are allied to *Neottopteris Nidus*.

Our broad-leaved *Taeniopterides* from the Rajmahal Hills belong to this genus.

To the palaeozoic forms Schimper would restrict the generic name *Taeniopteris*, Bgt., in which he is, as I think, quite right, although there is one species in particular, *Taeniopteris abnormis*,\* from the Permian in Saxony, which has nearly all the characters of *Macrotaeniopteris*, Schimp., the only difference to be detected being in the very close-set veins.

In a paper on the *Taeniopterides* from Chemnitz in Saxony,† Dr. Sterzel has redescribed the *Taeniopteris abnormis*, Gutb., and has found that this species is very closely allied to several mezozoic forms, amongst which are the *Macrot. gigantea*, Schenk., and our two Rajmahal species *Macrot. lata*, Oldh. Morr., and *Macrot. Morrisi*, Oldh.‡ Dr. Sterzel considers, therefore, this Permian species also as a *Macrotaeniopteris* and as a precursive form of several of the mezozoic species.

The relations of our Rajmahal species with the Rhætic *Macrot. gigantea*, Schenk., I have already pointed out in my first note on the fossil plants from the Rajmahal group (Rajmahal Hills).§

**MACROTÆNIOPTERIS DANÆOIDES**, Royle sp. (McClell.)

Pl. XIX, Figs. 1, 2 & XXI, Fig. 1.

1839. *Glossopteris danæoides*, Royle, Illust. Bot. etc. Him. M. Tab 2.

1849-50. ———— McClelland, Rep. Geol. Surv. India, XV. f. 1.

1876. ———— Feistmantel, Notes on the several floras in India, Rec. Geol. Surv. Ind. IX. 3. p. 74. Ibid., IX. 4.

*Frondē speciosa, oblongo-ovata, apice obtuse acuminata, basi attenuata obovata, distincte pedicellata, ad 34 cm. longa et 10 cm. lata, subcoriacea;*

\* Gutbier, Versteinerungen des Rothliegenden in Sachsen, 1849, Pl. VII. f. 1. 2.

† Ueber die Taeniopteriden von Chemnitz in Sachsen N. J. f. M. Geogn. 1876.

‡ This however only partly.

§ Rec. G. S. Ind. IX. 2. p. 36.



*rhachide mediocri striata; nervis secundariis sub angulo suberecto e rhachide egredientibus, usque ad 1.5 mm. distantibus, marginem versus paulo incurvatis, crassiusculis; simplicibus et furcatis alternantibus, furcatione differentibus in partibus longitudinis nervorum exhibita.*

The species was first described by Royle (l. c.) as *Glossopteris danaeoides*, although there is not anywhere the slightest anastomosis of the veins, which on the contrary are all parallel and dichotomously forked.

This fern belongs undoubtedly to the same species which McClelland later described as *Taeniopteris danaeoides* also from the Raniganj (Burdwan) coal-field; but his figures (Pl. XV 1, 1a, 16), are very incorrect, especially the enlarged portion (Fig. 1b). But we can at any rate certainly conclude from them that this *Taeniopteris* was found a second time in the Raniganj field, as McClelland's specimens do not differ from those of Royle. Later the same species has been brought by Mr. Hughes from the Jherria coalfield, where, as Mr. Hughes assures me, it is pretty frequent, though I can find only one specimen in our collections;—and now Mr. Wood-Mason has brought pretty numerous specimens of it from Raniganj, and his statement is that he brought only the very best, while he left behind great numbers of fragmentary ones. Also in the Barakur group in the Rajmahal Hills (near Burgo) the same species has occurred.

*Taeniopteris* is, therefore, as is seen from this examination, not wanting in the Raniganj field and from the Damudas generally, the more so if we consider that from the Kamthis also several specimens are known.

I have figured two specimens and two enlarged portions; the two figures complete one another, one being the basal, the other the apical portion.

The chief character of this species is the very distant veins; these pass out from the rhachis, which is proportionally thin, at nearly right angles, and run almost straight to the margin, where they are a little incurved; the veins are about 1.5 mm. apart; simple and forked veins alternate; the furcation does not follow any constant law; some of the veins are forked at the very base and may be forked again, others more towards the middle, and others quite close to the margin.

The apex is obtusely acuminate; at base the frond is obovate and apparently pedicellate.

The biggest frond is 10 cm. broad and must have been at least 34 cm. long.

By the great distance of the veins apart this species differs from all others, but most approaches that from the Rajmahal hills which Messrs. Oldham and Morris described as *Taeniopteris musaeifolia*,\* but which is, as I think, barely distinguishable from *Taenopt. lata*, O. M.; the only differences detected by Mr. Oldham being the slightly more distant veins and the more coriaceous consistence of the frond.

\* Rajmahal Flora, Pal. Ind. 1862, Pl. IV. f. 1.



But these Rajmahal species approach on one hand pretty nearly the Rhætic *Macrot. gigantea*, Schenk,\* on the other hand those forms from the Kamthis which I have lately briefly described as *Macrot. Feddeni* Fstm.,† and which are all to a certain degree related to that Permian *Taeniopt. abnormis*, Gubb., of which I have already spoken.

These species are all based chiefly upon the different distances apart, the formation, the direction, and the thickness, of the veins, and if we compare all together, then we have the following table:—

1. *Macrotæniopteris danacoides*, McClell., with the most distant veins, nearly straight.
2. *Macrotæniopteris gigantea*, Schenk., and the Rajmahal species, *Macrot. lata*, O. M. and *Macrot. musaeifolia*, O. M., with veins almost equally distant.
3. *Macrot. Feddeni*, Fstm., with pretty close veins, a little oblique.
4. *Taeniopt. (Macrotæniopt) abnormis*, Gubb., with very close and almost straight veins.

For us it is a great satisfaction to find the genus *Macrotæniopteris* so frequently represented, as Mr. Oldham to the last maintained that no *Taeniopteris* are in the Damudas,‡ and in a letter to Mr. W. B. Clarke, which this latter gentleman has published in his 'Remarks on the Sedimentary formations in New South Wales,' 3rd Edition, 1875, p. 29,§ Mr. Oldham maintains that in the Panchet group also no *Taeniopteris* has been found, although it occurs.

Amongst all the numerous specimens not one occurred which showed any trace of fructification, so that it cannot be decided with certainty to which living genus the species should be referred, but as far as can be judged from the form of the leaf and from the veins I would refer it to some form of *Acrostichum*, for example, *Acrostichum hybridum*, Bory. Its fossil allies have been already indicated.

#### MACROTÆNIOPTERIS sp.

Another specimen of *Macrotæniopteris* occurred; but it unfortunately is so badly preserved that it cannot be figured nor any exact description of it given. It is only a portion of a leaf-surface, no rhachis being preserved.

\* Schenk, Flora des Grenzschiehten, Tab. XXVIII. p. 146.

† Records G. S. Ind. IX. 4.

‡ In Mem. G. S. Ind. II. p. 329 he said so quite plainly.

§ In the Mines and Mineral Statistics of New South Wales, 1875, where Mr. W. B. Clarke's Sedimentary formations, etc., is included, page 175.



It shows that the leaf was much bigger than those of the species just described, and that the veins are much closer together and are not so straight and stiff as in *Macrotæniopteris Feddeni*, Fstm. from the Kamthis, so that I would not venture to identify it with this species.

I mention this specimen only to show that another kind of *Macrotæniopteris* also occurs at Raniganj besides *Macrot. danaeoides*, and I am sure that further investigations will furnish more fossils of this kind. These *Macrotæniopterides* establish a palæontological relation between the lower and upper portions of the Gondwana system.

Type *Vittaria*, Swartz.

Genus *Palæovittaria*, nov.

On pl. xix, fig. 3 is figured a splendid specimen, which from the characters of the veins must be considered a fern. There is a distinct midrib (*rhachis, costa*) in the lower part of the frond, pretty broad, becoming thinner upwards and vanishing completely in the apical portion.

The secondary veins pass at very acute angles towards the margin, where they are a little incurved; they are single and forked as in *Tæniopteris*, but the specimen cannot be placed with this genus, and recalls, as Dr. Kurz informs me, in this character the nervation of the living genus *Vittaria* only, so that I use for our fossil the generic name *Palæovittaria*.

Diagnosis.—*Frondibus simplicibus, oblongato-ovalibus, costa apicem versus evanescente. Nervis secundariis sub angulo acutissimo egredientibus. Nervatio Vittariæ.*

There is only one species, which I call

*PALÆOVITTARIA KURZI*, n. sp., Pl. XIX, Figs. 3—4.

*Frondibus aggregatis, simplicibus, oblongato-ovato-spathulatis, margine integris, nonnunquam apice excisis, nervo medio (costa) inferiore in parte crassiore, dimidiam partem versus evanescente; nervis secundariis sub angulo acutissimo e rhachide exeuntibus, in parte apicali radiantibus, simplicibus et furcatis; marginem versus incurvatis, sequente precedentem ea in parte attingente. Fructificatione non obvia.*

About 9 fronds come out from a common point; they are generally oblong-spathulate, entire on the margins, but they are sometimes deeply emarginated and therefore bilobate at the apex.

The chief characters are in the midrib and in the secondary veins; the former is well developed and distinct in the lower portion of the leaf, but in the upper portion this vein vanishes, becoming dissolved in the secondary veins.



The secondary veins pass out from the rhachis at a very acute angle pretty straight towards the margin, where they are incurved. In the apical portion, where is no midrib, the secondary veins radiate fan-wise. The secondary veins are alternately single and forked; the furcation occurs at different parts of the length of the veins, all of which are regularly equally distant from one another. I cannot observe any distinct peduncle; the leaf becomes more attenuate towards the base and the rhachis thicker, until at last only the latter remains.

It seems certain that the aggregation of the leaves is not due to an insertion on a common stalk, but rather to associated growth out from the rhizome. As I have said, this form has no analogue in any existing fern except *Vittaria*, where also the rhachis vanishes towards the apex and the secondary veins pass out at a very acute angle from it; the only difference being that our fern has many more secondary veins, and that the frond in proportion to its length is much broader. I have obtained from Mr. Kurz a good collection of Indian *Vittariae* for comparison, and of these the *Vittaria intermedia* from Java comes nearest to ours. But amongst the American forms are some still broader ones, which would come still nearer.

Amongst fossils nothing is as yet known at all like our fossil plant.

If we take the single leaf and consider only its shape and the general disposition of the veins, then we find an approximate similarity in *Sagenopteris*, but here the leaves come out from a common stalk and the secondary veins anastomose so as to form a net-venation.

Amongst the *Taeniopterides* we find scarcely any similarity, as all these have a rhachis continuous to the apex of the frond, and the angle at which the secondary veins pass out from it, as for instance in *Taeniopteris Morrisi*, Oldh.,\* or in *Phyllopteris plumula*, Sap.,† far less acute than in our fossil.

#### IV.—DICTYOPTERIDES.

This order includes all ferns with net-venation. This is again only a palæontological order, for in the same living genera are forms with forked, as well as with netted veins, for instance, in *Pteris*, *Asplenium*, etc.

But there is yet a peculiarity: it is that most of the ferns with net-venation occur in the mezozoic epoch, without any corresponding forms with free veins, while in the palæozoic epoch the ferns with net-venation are very rare, those with free veins predominating. In the palæozoic we have mostly only *Lonchopteris*, Bgt., which has its analogy in *Alethopteris*, and *Dictyopteris* with complete analogy in *Neuropteris*; so that the order *Dictyopterides* (cae) can very fairly be considered to be a mezozoic one.

\* Oldham and Morris, Rajmahal Flora, Pal. Indica, 1862, Pl. III, f. 1.

† Saporta, Végét. foss. de France (Palæont. Française), Pl. LXIII, f. 6.



There are a good many genera which to a great extent have living analogies, and those sometimes very close.

In Schimper's 'Palaeontologie végétale,' p. 737, we find the whole sequence of genera which at that time were known; 15 genera being enumerated.

Of these two occur in our Raniganj Series.

But to Schimper's list must be added, *Gangamopteris*, McCoy, first described as *Cyclopteris*, but having also a net-venation.

To this genus belongs also that fossil from the Talehir which until recently was generally quoted as *Cyclopteris*, but which lately I described as *Gangamopteris cyclopteroides*; of this genus I will describe another species in this present paper.

#### Genus *Belemnopteris*, nov.

*Fronde simplici late sagittaeifolia pedunculata. Nervis primariis tribus, medio crassiore, ceteris anastomosantibus.*

Amongst Mr. Wood-Mason's specimens are two, of which one is tolerably complete and has an arrow-like shape, with 3 chief veins, one stronger passing into the leaf, two others a little thinner into the two basal lobes; the other venation is netted.

It strongly reminds one of some living ferns.

1. First we have *Gymnogramme sagittata*,\* a *Polypodiaceae* which formerly was described as *Hemionitis sagittata*, Fée., with which the *Hemionitis cordata*, Hook. and Grev. (*Hemionitis cordifolia*, Roxb.),† is identical; of this later Mr. Kurz has lent me specimens from Dacca.

With this fern our fossil has little more than the shape of the leaf and perhaps also the primary veins in common, while in the net-venation the two are rather different.

2. There is another fern with which our fossil can be compared, especially as regards the net-venation: this is *Pteris sagittaeifolia*, Raddi‡; this fern is narrower than ours, but the disposition of the 3 primary veins, and the net-venation particularly, agree well with the same in our fern.

Of course, only the fructification can decide to which of these two our fossils should be placed, but as none is to be seen and as our fern cannot be identified with either, on the contrary, presents characters of both, I consider myself justified in establishing a new genus.

It is of very great interest (1st) as it is a form so closely allied to living ones, and (2nd) as it is a fern with a net-venation.

\* See Ettingshausen, Farrenkräuter der Jetztwelt, etc., 1865, p. 59, Pl. XXXI, f. 9.

† See Beddome, Indian ferns (of South India), Pl. LII, p. 18; also Lowe, Ferns, etc., Vol. VII, Pl. XXXVIII, p. 93.

‡ Ettingshausen, l. c., p. 104, Pl. LXXI, f. 3.





BELEMNOPTERIS WOOD-MASONIANA, n. sp., Pl. XX, Figs. 1—2.

*Fronde simplici, late sagittaeifolia, apice obtusa, margine integerrima, tota ad 10·5 cm longa, lobis obtuse acuminatis longioribus (5·3 cm longis) ; nervis primariis tribus ; uno crassiore in folii superficiem excurrente, duobus aliis tenuioribus, in lobos currentibus, omnibus tribus apicem versus attenuantibus ; nervis secundariis sub angulo subacuto egredientibus, anastomosantibus, retia plerumque hexagonalia, sed etiam polygonalia, formantibus. Fructificatione ignota.*

Of the relations of this fern I have already spoken when discussing the genus ; they are only in the living flora, nothing like it being known amongst fossils.

The frond is simple, is shaped like a broad arrow, at the apex obtuse ; the margin entire, slightly arcuate, the total length 10·5 cm ; the basal lobes obtusely acuminate, pretty long (5·3 cm.). The chief characters lie in the veins : there are three chief veins, one passing into the surface of the leaf, the two others, a little thinner, into the two basal lobes.

The secondary veins pass out at a subacute angle so as to form a net-venation with hexagonal or polygonal meshes.

This is one of the finest specimens in Mr. Wood-Mason's collection.

Genus *Gangamopteris*, McCoy, 1875.

I have already had occasion to mention this genus in my first note on the Damuda fossils,\* when speaking of *Gangamopteris cyclopteroides* from the Barákars being identical with the species in the Talchirs.

In another paper† I have described another *Gangamopteris* from the Kamthis as *Gangamopt. Hughesi*, which is different from, though closely related to, the species from the Barákars and Talchirs, a wider venation constituting the difference.

I now describe a third, differing from both of these by its very wide net-venation.

I think it will not be considered useless and superfluous to repeat that this genus *Gangamopteris* occurs in true mezozoic rocks in Victoria, and that nothing of the kind is as yet certainly known from the lower portion of the New South Wales coal-strata.

Our new *Gangamopteris* is again a form to which some analogies are to be found in the living flora.

GANGAMOPTERIS WHITTIANA, n. sp., Pl. XX, Figs. 3—4.

*Fronde simplici, late ovato subrhomboidali inaequilaterali, integerrima, obtuse acuminata ; costa nulla, sulco medio tantum indicata ; nervis ceteris omnibus e basi duobus in directionibus marginem versus radiantibus, omnibus anastomosantibus, retia valida, oblonge hexagonalia aut polygonalia formantibus. Fructificatione non obvia.*

\* Rec. G. S. Ind. Vol. IX. 3.

† Ibid., IX, 4.



I name this fine species (of which two specimens, both of them figured, are in Mr. Wood-Mason's collection) after Mr. Whitty of Kurhurbáli, who last year increased our knowledge of the Kurhurbáli plants by four very interesting species all on the same big slab of shale.

It differs from both those already described by me, as well as from all described by Mr. McCoy from Australia.

Our specimen shows a broadly ovately subrhomboid frond, which besides seems obliquely shaped; the apex is obtusely acuminate; there is no midrib as in this genus generally, this being indicated in the middle only by a slight furrow, from which the secondary veins pass in two directions towards the margin, which is entire; the secondary veins all anastomose and form large oblongly hexagonal or polygonal areoles, larger than in any known species of the genus; the areoles are largest in the middle, becoming smaller towards the margin.

Fructification not observed.

This very fine fern has an apparent analogy to the living genus *Antrophyum*, and to those forms of it which have no midrib; and there are amongst the Indian living *Antrophyum* some species to which our fossil can be compared. I refer especially to *Antrophyum latifolium*, Bl.\*, from the Khasya Hills, of which Mr. Kurz has lent me several specimens for comparison. I think this is the only fern to which our fossil can be referred. If this be right, it may well be doubted whether the other two species of *Gangamopteris* should be referred to the same living forms; it is rather possible that this genus also is only a palæontological one, for both the other species of it have the leaves differently shaped, although the disposition of the veins in them is similar.

#### Genus *Glossopteris*, Bgt., 1828.

*Frondibus simplicibus* (?), *elongato spathulatis, apice obtusis vel acuminatis, "costa usque ad apicem continuante," nervis secundariis anastomosantibus.*

\* This is the famous genus which has caused so much confusion in the determination of the age of our Damúda Series and the Australian coal-strata.

As I have prepared a monograph of it, I will only briefly speak of it here.

a. In Australia *Glossopteris* is known from rocks (the Australian coal-strata) wherein several strata are to be distinguished; the lowest of these is marked by a numerous marine fauna of generally carboniferous alliances. With these some forms of *Glossopteris* occur, though rather rarely.

\* Beddome, Ferns from British India, etc., Part XII, Pl. CLXXVI.



*b.* In the upper coal-strata no marine fauna is found. *Glossopteris* is very frequent, and is associated with other plants with no carboniferous characters at all.

*c.* Below the lower portion of the coal-strata is a formation with a true lower carboniferous flora and the same marine fauna, of which no trace is in the upper (Newcastle) coal-strata.

*d.* From this it would follow that the lower coal-strata, with marine fauna of carboniferous age, had been a long time deposited, or that the carboniferous period had passed away, when the upper coal-strata were formed, or when that period began when *Glossopteris* was especially developed, with other plants which contrast with those of the lower portion.

When later the *Glossopteris* was found frequently in the Damúda Series, these were at once compared with the Australian lower coal-measures,\* although no trace of any marine organism had ever been found in them, and only a flora occurred which was opposed to such a comparison.

I think our Damúda Series, containing only a flora, cannot be compared with the lower Australian coal-strata at all, which contain hardly anything but a marine fauna.

Such transitional forms as *Glossopteris* in Australia we find here in India also.

So in the Damúda Series and the Panchet group the same *Schizoneura Gondwanensis*.

In the Rajmahal group and in the Jabalpur-Kach group are the same two species of *Ptilophyllum*, Morr., and yet there is a difference in age.

In the Salt Range in India we find in the carboniferous strata on the one hand the Devonian genus *Goniatites*, on the other the mezozoic genera *Phylloceras* and *Ceratites*.

In the Trias of the Salt Range we find again the same *Bellerephon* (a purely carboniferous genus) which in the carboniferous limestone is already frequent, and yet all these strata are different.

So is it in Australia too, *Glossopteris* survives from the lower coal-strata in the upper ones, the former being characterized by a marine fauna.

Here in India it is also of no direct influence on the determination of age, while the other plants with which it is here associated certainly are; it indicates of course only for the whole Damúda Series the same age, as no animal fossils contradict.

But yet another point must be mentioned: most of our species of *Glossopteris* are different from those of Australia, and all the other plants in our Damúdas are much more closely connected with European forms than with any in Australia.

\* T. Oldham, Mem. G. S. Ind. II.



I have reported on this subject in my first note on the Damúda fossils,\* and have done so recently more at length†; so that here I will be very brief.

1. We must acknowledge the existence of *Glossopteris* in Australia during the time of the lower coal-strata, the character of which is expressed by a most predominant marine fauna.

2. The carboniferous character of the strata ceased with the extinction of the carboniferous fauna, *Glossopteris* still surviving and becoming much more frequent in the succeeding period, which is marked by a flora only indicative of a mezozoic age.

3. In India *Glossopteris* is very frequent too, but mostly under different forms and associated with no fauna, but with a tolerably abundant flora, the alliances of which are unmistakably mezozoic and triassic.

As to the affinities in the living flora, they can be partly found out. In the Kamthis there occur pretty frequently specimens with a fructification consisting of very well-marked sporanges in the areoles, indicating the fructification of the genus *Polypodium*; and this might be the case also with a great many of the others, while a good many of the Raniganj species remind one, in the venation, of the genus *Antrophyum*, and of this those forms with a midrib; we would have, therefore, here also a relation of some of the *Glossopteris*, Bgt., to *Gangamopteris*, McCoy, parallel to that which we find in *Antrophyum*, i. e., forms with and forms without midrib. In the Australian *Glossopterides*, Mr. Carruthers seems to have observed a fructification along the veins; this would perhaps indicate some difference between ours and the Australian ones.

At present I have to mention only two species as contained in Mr. Wood-Mason's collections, one of them in fructification.

*GLOSSOPTERIS ANGUSTIFOLIA*, Bgt., Pl. XXI, Figs. 2—4.

1828. Brongniart, Hist. des. végét. foss. I. p. 227, Pl. LXIII. f. 1.

1845. Unger, Synopsis Plant. fossil, p. 95.

1850. Unger, Genera et Species Plant. foss., 169.

1876. Feistmantel, Rec. G. S. India, IX. 3. p. 72.

*Fronde angusta usque ad 18—20 cm. longa et 1·7 cm. lata; apice acuminata, rhachide (costa) crassa, nervis secundariis sub angulo acuto egredientibus, omnibus anastomosantibus; retibus, rhachidi proximis, maximis, marginalibus oblongis angustissimis. Margine marginato, fructificationem indicante.*

This species was first described by Brongniart (l. c.) from Raniganj; but he had only incomplete specimens, which, however, were given again in Schimper's 'Palæontologie végétale.'

\* Rec. G. S. I. IX. 3.

† Ibid, IX. 4.



In Brongniart's figures the veins particularly are not rightly figured, and the margin also is incorrect. This author also made the same mistake in the *Glossopteris Browniana*, drawing the veins as anastomosing only to the middle of the leaf-surface (on both sides of the stalk) and thence to the margin dichotomous only; while they in reality anastomose throughout until they reach the margin. The same is also the case with *Glossopteris angustifolia*, Bgt. In Brongniart's figures we find some nets on each side of the rhachis only, and then the veins are regularly dichotomous. This is not so.

Mr. Wood-Mason has brought several specimens, of which I give three figures, and which show the relations better.

The frond is rather narrow, about 1·7 cm. broad and only about 18—20 cm. long; the rhachis is proportionally very thick (2 mm.) and reaches to the apex; this is quite acuminate; the secondary veins pass out at a pretty acute angle from the rhachis and are there tolerably thick and form tolerably large polygonal oblong areoles; but from here they are resolved suddenly into many branches, which form oblong and narrow areoles up to the margin; here they are curved along the margin in such a manner that one always catches the next so as to form areoles even on the margin, Brongniart representing them as ending straightly.

On both sides of this marginal ending of the areoles one can observe with the lens a smooth line running along the whole margin (see fig. 2a. Pl. XXI), of which in Brongniart's figure nothing is to be seen.

Does this indicate a marginal fructification? If so, then we have perhaps an analogy in *Pteris* or *Schizoloma*.

This discovery of Mr. Wood-Mason's modifies my statement in Rec. G. S. Ind. IX. 3, p. 72, when I stated, that I had not rediscovered any specimen from India: this was right as to our collection, Mr. Wood-Mason's specimens having been acquired later. The specimen which I mentioned (on the same page) as from the upper portion of the Australian coal-strata, now appears different from our Indian *Glossopt. angustifolia*, Bgt. as above characterised.

#### GLOSSOPTERIS COMMUNIS, Fstm., Pl. XXI, Fig. 5.

*Fronde simplici, variante, sed plerumque speciosa, integerrima, ovato-oblonga, apice elongato-acuminata, basi attenuata in rhachidem decurrente, rhachide crassa usque ad apicem currente, nervis omnibus anastomosantibus, retia oblonga, angustissima formantibus. Fructificatione ignota.*

Of this species I have given only a portion of a frond, twice enlarged to show the character of the net-venation; in my monograph on *Glossopteris* I shall have occasion to figure a good many nice specimens.





This species, the commonest near Raniganj, is also not wanting in other places. It resembles in shape pretty well the *Glossopteris indica*, Schimper, but the net-venation is different, as also is that of the Australian *Glossopteris Browniana*, Bgt.

I have completed the description a little from other specimens, to make myself understood.

The frond is simple, oblong-oval, the apex oblongly acuminate (as in *Glossopt. indica*, Schimp., while it is obtuse in *Gloss. Browniana*, Bgt.); at base the frond is attenuate, running down into the rhachis; the rhachis thick, reaching to the apex; the secondary veins all of pretty equal thickness, all anastomosing; the areoles are all pretty equally oblong and very narrow (while in *Glossopt. indica* they are more polygonal and larger next the rhachis), reaching to the margin. The fructification of this species is unknown to me, but in *Glossopteris indica*, Schimp., it consists, as I have mentioned, of round sporanges in longitudinal rows.

At Raniganj the *Glossopt. indica*, Schimp., seems rarer than *Glossopt. communis*, Fstm., but both species seem to have been of nearly the same size. In the Kamthis *Glossopt. communis* is frequent enough, and it occurs frequently also in the other groups of the Damuda Series.

From Raniganj there are known besides a great many *Glossopterides*, which, however, I will describe later.

#### Genus *Sagenopteris*? Bgt.

If I am right in placing *Glossopt. acaulis*, McClell.,\* in *Sagenopteris*, Bgt.,† then the specimens from Mr. Wood-Mason's collection figured on Pl. XX, Figs. 5, 6, must be placed with it too, as I believe them to belong to the same species which McClelland called *Glossopteris acaulis*. These two specimens do not come out quite plainly from a common stalk, but their relative position to each other on the stone would lead one to suppose that they do so; that they are identical with that species of McClelland seems also to be indubitable, as the net-venation is of the same kind.

What induced McClelland to apply the specific name "*acaulis*" to a plant the leaves of which are so very distinctly pedicellate, I cannot understand, and I think that in this case there will be no objection to my rejecting this specific name, especially as McClelland's figure is so bad, more resembling a dicotyledonous leaf.

It is true that the real *Sagenopteris* from the Rhætic and Lias had not so many, nor such distinctly pedicellated, leaves, but the general disposition of the leaves in our specimens, and their insertion on a common

\* Report Geol. Surv. 1848-49, Pl. XIV. f. 3.

† Rec. Geol. Surv. Ind. IX. 3, p. 73.



stalk, the net-venation, and the midrib vanishing towards the apex, seem to justify my placing this form under *Sagenopteris*, Bgt.

*SAGENOPTERIS POLYPHYLLA*, Feistm., Pl. XX, Figs. 5, 6.

*Foliis pluribus in pedunculo communi insertis, oblongis, distincte pedunculatis; nervo medio apicem versus evanescente; nervis secundariis anastomosantibus.*

I have given as complete a diagnosis as possible from the two specimens figured in the present paper, but as it is have been obliged to take some of the characters from McClelland's original specimens of *Glossopteris acaulis*, which are in our Museum, and of which it is my intention to give better figures in my monograph.

The two specimens figured from Mr. Wood-Mason's collection certainly belong to the same species.

They differ from *Glossopteris* by their net-venation and by the midrib vanishing towards the apex. The specimens here figured are basal portions of leaves and well show the stalk. Their relative position to each other on the stone is such as to lead one to suppose they were inserted on a common stalk.

With this I will rest satisfied at present. *Sagenopteris* is a Rhatic and Liassic form, and I do not think anybody can consider our form as Palæozoic.

I think that amongst the Raniganj fossils in the Geological Museum will be perhaps some more forms of this genus, but as these are still undescribed, I will not mention them here.

Of other ferns, which are also from the Raniganj group, and which I have partially described, I may on account of the connection also mention

*ACTINOPTERIS BENGALENSIS*, Feistm.

1876. Feistmantel Rec. Geol. S. Ind. IX. 3. p. 76.

In my note (l. c.) I have given a diagnosis of this fern and have here nothing to add. I will describe the species fully in a future paper and give a figure of it.

I now give a general list of the ferns as I did in the case of the *Equisetaceae*.



*General view of the Filices in the Raniganj field.*

| Names of the species from the Raniganj field.                              | Where in other portions of the Damúdas and analogies in the Upper Gondwanas.                                              | Analogies in Europe.                              |                                                                                                                                     | Analogies in Australia.                                                       |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
|                                                                            |                                                                                                                           | Trias.                                            | Jura.                                                                                                                               |                                                                               |
| Order <i>Sphenopterides</i> .                                              |                                                                                                                           |                                                   |                                                                                                                                     |                                                                               |
| <i>Sphenopteris polymorpha</i> , Feistm. ....                              | In the Barákar group, Talchir (Cuttack) Orissa.                                                                           | ....                                              | <i>Sphenopteris athyrioides</i> , Bgt. sp.                                                                                          | <i>Sphenopteris alata</i> , Schimp., the upper portion only.                  |
| Order <i>Pecopterides</i> .                                                |                                                                                                                           |                                                   |                                                                                                                                     |                                                                               |
| Group of <i>Alethopteris Whitbyensis</i> , (Schimp. 1869 Fstm. 1876) ..... |                                                                                                                           |                                                   |                                                                                                                                     |                                                                               |
| <i>Alethopteris Lindleyana</i> , Royle sp. ....                            | Analogous to <i>Alethopteris indica</i> , O. M., from the Rajmahal Hills.                                                 | ....                                              | <i>Alethopteris Whitbyensis</i> , Göpp. in Lias and Oolites.<br><i>Asplenites (Cladophlebis) Rosserti</i> Schenk, from the Rhaetic. | <i>Pecopteris (Alethopteris) australis</i> , McCoy, from Tasmania (mezozoic). |
| <i>Alethopteris comp. Whitbyensis</i> , Göpp. ....                         | <i>Alethopteris Whitbyensis</i> in Kach. <i>Al. indica</i> , O. M., in Rajmahal Hills.                                    | ....                                              |                                                                                                                                     |                                                                               |
| Type <i>Phegopteris</i> , Mett.                                            |                                                                                                                           |                                                   |                                                                                                                                     |                                                                               |
| <i>Alethopteris phegopteroides</i> , Fstm. ....                            | ....                                                                                                                      | <i>Pecopteris Stuttgardensis</i> , Bgt. (Keuper). | ....                                                                                                                                | ....                                                                          |
| Order <i>Teniopterides</i> .                                               |                                                                                                                           |                                                   |                                                                                                                                     |                                                                               |
| <i>Macrotaeniopteris danæoides</i> , Royle sp. ....                        | In the Barákar group near Burgo, (Rajmahal Hills.)<br>Some analogy with <i>Macrot. musafolia</i> , O. M., Rajmahal Hills. | ....                                              | Some liassic forms.                                                                                                                 | ....                                                                          |



| Names of the species from the Raniganj field.   | Where in other portions of the Damúdas and analogies in the upper Gondwanas. | Analogies in Europe. |                           | Analogies in Australia.              |
|-------------------------------------------------|------------------------------------------------------------------------------|----------------------|---------------------------|--------------------------------------|
|                                                 |                                                                              | Trias.               | Jura.                     |                                      |
| Macrotaeniopteris sp. ....                      | ....                                                                         | ....                 | ....                      | ....                                 |
| Type <i>Vittaria</i> , Swartz.                  | ....                                                                         | ....                 | ....                      | ....                                 |
| Genus <i>Palaeovittaria</i> nov., Fstm.         |                                                                              |                      |                           |                                      |
| <i>Palaeovittaria</i> Kurzi, Fstm.              |                                                                              |                      |                           |                                      |
| Order <i>Dictyopterides</i> .                   |                                                                              |                      |                           |                                      |
| Genus <i>Belemnopteris</i> nov., Fstm.          |                                                                              |                      |                           |                                      |
| <i>Belemnopteris</i> Wood-Masoniana, Fstm. .... | ....                                                                         | ....                 | ....                      | ....                                 |
| Genus <i>Gangamopteris</i> , McCoy, ....        | ....                                                                         | ....                 | ....                      | ....                                 |
| <i>Gangamopteris</i> Whittiana, Fstm. ....      | Genus in the Barakars and Talchirs.                                          | ....                 | ....                      | Genus in Australia (Victoria).       |
| Genus <i>Glossopteris</i> .                     |                                                                              |                      |                           |                                      |
| <i>Glossopteris</i> angustifolia, Bgt. ....     | ....                                                                         | ....                 | ....                      | ....                                 |
| <i>Glossopteris</i> communis, Fstm. ....        | Throughout the Damuda Series.                                                | ....                 | ....                      | New South Wales ? upper coal-strata. |
| <i>Sagenopteris</i> polyphylla, Fstm. ....      | ....                                                                         | ....                 | Genus Rhætic and Liassic. | ....                                 |
| <i>Actinopteris</i> Bengalensis, Fstm. ....     | ....                                                                         | ....                 | Genus Rhætic.             | ....                                 |

## CONCLUSIONS.

1. Mr. Wood-Mason's collection has yielded 14 species, two belonging to the Equisetaceæ, and 12 being ferns.
2. Amongst these fourteen are two new genera (besides a new type of *Alethopteris*) and seven new species. The collection, therefore, increases considerably our previous knowledge of Raniganj plants.
3. The character of the whole flora is mezozoic. The prevalence of ferns with net-venation (not being *Glossopteris*), and the occurrence of *Taeniopteris* especially shows this.
4. But also *Glossopteris* has shown some differences as compared with those in Australia: I refer to the margined margin in *Glossopteris*



*angustifolia*, indicating perhaps a *Pteris*-fructification, while some Kamthi specimens show a *Polypodium*-fructification, and some Australian ones show a fructification along the veins.

5. Amongst the Equisetaceae *Schizoneura* is decisive, which is so frequent in the collection of the Geological Survey.

6. Amongst the ferns the *Alethopteris phegopteroides* is very close to the living *Phegopteris*; *Belemnopteris* is very close to some living forms; *Gangamopteris Whittiana* is very close to the living *Antrophyum*; and *Palaeovittaria* is very remarkable; of importance besides these is *Macrortaeniopteris danaeoides* and *Alethopteris* comp. *Whitbyensis*, Göpp.

*Alethopteris phegopteroides* reminds one also of a Triassic type, the *Pecopt. Stuttgardensis*, Bgt.

7. Mr. Wood-Mason's specimens afford strong corroboration of my views as to the mezozoic age of the Damudas in general.

8. With the lower portion of the Damudas, namely with the Barákars, the upper has *Sphenophyllum trizygia*, *Vertebraria indica*, *Sphenopt polymorpha*, *Macrortaeniopteris danaeoides*, *Glossopteris communis*, and the genus *Gangamopteris*, in common; so that the close palæontological connection of the two is again seen.

9. The Kamthi group has with the Raniganj the same *Phyllothea indica*, *Vertebraria indica*, and the same *Glossopteris communis* in common.

10. With the Australian lower coal-strata no comparison at all is possible as not one single marine animal has been met with in our Raniganj group or indeed in any part of the Damuda Series.

11. A comparison, if any, is only possible with the upper coal-beds of Australia, which alone are mezozoic and contain several fossils identical with those of our Damuda Series.

12. A complete register of the fossils from the Damúdas, including Mr. Wood-Mason's new forms, has been given by me in Records G. S. India, 1876, IX, No. 4.







## EXPLANATION OF THE PLATES.

## Plate XV.

- Figs. 1—2. *Sphenophyllum Trizygia*, Ung. Two branchlets showing well the characteristic disposition of the leaflets in the articulation. Fig. 2a. One leaflet enlarged to show the mode of origin and the distribution of the veins.
- Figs. 3—4. *Vertebraria Indica*, Royle. Fig. 3. Good specimen, with a branch exhibiting the same characters as the main stem. This specimen is particularly remarkable, as showing distinctly enough ribs on the surface, which in several places (a a a) form "articulations." Fig. 4. A portion of a rootlet of the same species.

## Plate XVI.

- Figs. 1—3. *Schizoneura Gondwanensis*, Feistm., branchlets and leaflets of this important species.
- Fig. 4. *Vertebraria indica*, Royle, a stem exhibiting regular articulation, and consequently the equisetaceous nature of this fossil.
- Figs. 5—7. *Sphenopteris polymorpha*, n. sp. Fig. 5, top portion of the frond. Figs. 6 and 7, leaflets from lower portions. The rhachis broadly winged.

## Plate XVII.

- Figs. 1—3. *Sphenopteris polymorpha*, n. sp., illustrating pinnæ from different portions of the frond. Fig. 1. Top portion. Fig. 1a. A leaflet enlarged. Figs. 2 & 3. Pinna and leaflet from the lower portion of the frond. Fig. 3a. One pinnula enlarged. Rhachis broadly winged.

## Plate XVIII.

- Figs. 1. 2. *Alethopteris phegopteroides*, n. sp. A very interesting type in the group of *Pecopterides*, approaching most strikingly the living *Phegopteris*. Fig. 1. Shows a portion of the frond and the disposition of the pinnæ and the pretty thick rhachides. Fig. 2. Two entire pinnæ with their apices. Fig. 1a. Illustrates the disposition of the veins in the pinnulæ. Fig. 2a. The top portion of the pinna.

## Plate XIX.

- Fig. 1. 2. *Macrotaeniopteris (Taeniopteris) daweoides*, Royle sp. (McClell.). Two out of many other specimens. Fig. 1a. Shows the distribution and the mode of furcation of the veins.
- Figs. 3. 4. *Palaeovittaria Kurzi*, gen. et sp. nov. Fig. 3a. Shows the basal portion, with the midrib and secondary veins issuing from it. Fig. 4a. The relations of the secondary veins in the top portion.

## Plate XX.

- Figs. 1—2. *Belemnopteris Wood-Masoniana*, gen. et sp. nov. (N. B.—The two lobe-veins are a little exaggerated.) Fig. 2. Represents what is believed to be the top portion of the leaf of the same species.
- Figs. 3—4. *Gangamopteris Whittiana*, n. sp. Two specimens with very large areoles of that intermediate form between *Glossopteris* and *Cyclopteris*, which has lately proved so frequent in our Barakur group. These specimens exhibit very well the distribution of the vein-areoles in two directions towards the margin without any midrib.



Figs. 5—6. *Sagenopteris polyphylla*, n. sp. These two specimens belong, I believe, to that form which McClelland first mentioned as *Glossopteris acaulis*, which, however, I consider to be a *Sagenopteris*.

Plate XXI.

Fig. 1. *Macrotaniopteris danacoides*, Royle sp. a portion from the middle part of the leaf enlarged to show the development of the secondary veins from the midrib.

Figs. 2—4. *Glossopteris angustifolia*, Bgt. Fig. 2. A nearly complete leaf with base and apex. Figs. 3 and 4 top portions of the leaf—all exhibiting the margined margin which probably indicates the fructification—which in this case would be a "fructificatio-Pteridis." Fig. 2a. A portion, enlarged to show the veins and the marginal smooth longitudinal portion of the leaf.

Fig. 5. *Glossopteris communis*, n. sp. A portion of a *Glossopteris*, which is very frequent throughout the Damuda Series.

Fig. 6. *Alethopteris Whitbyensis* (?), Göpp. Two pinnulae belonging most probably to this mezozoic species.













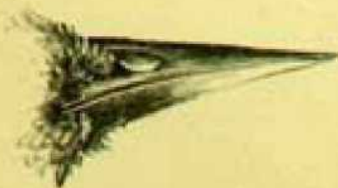
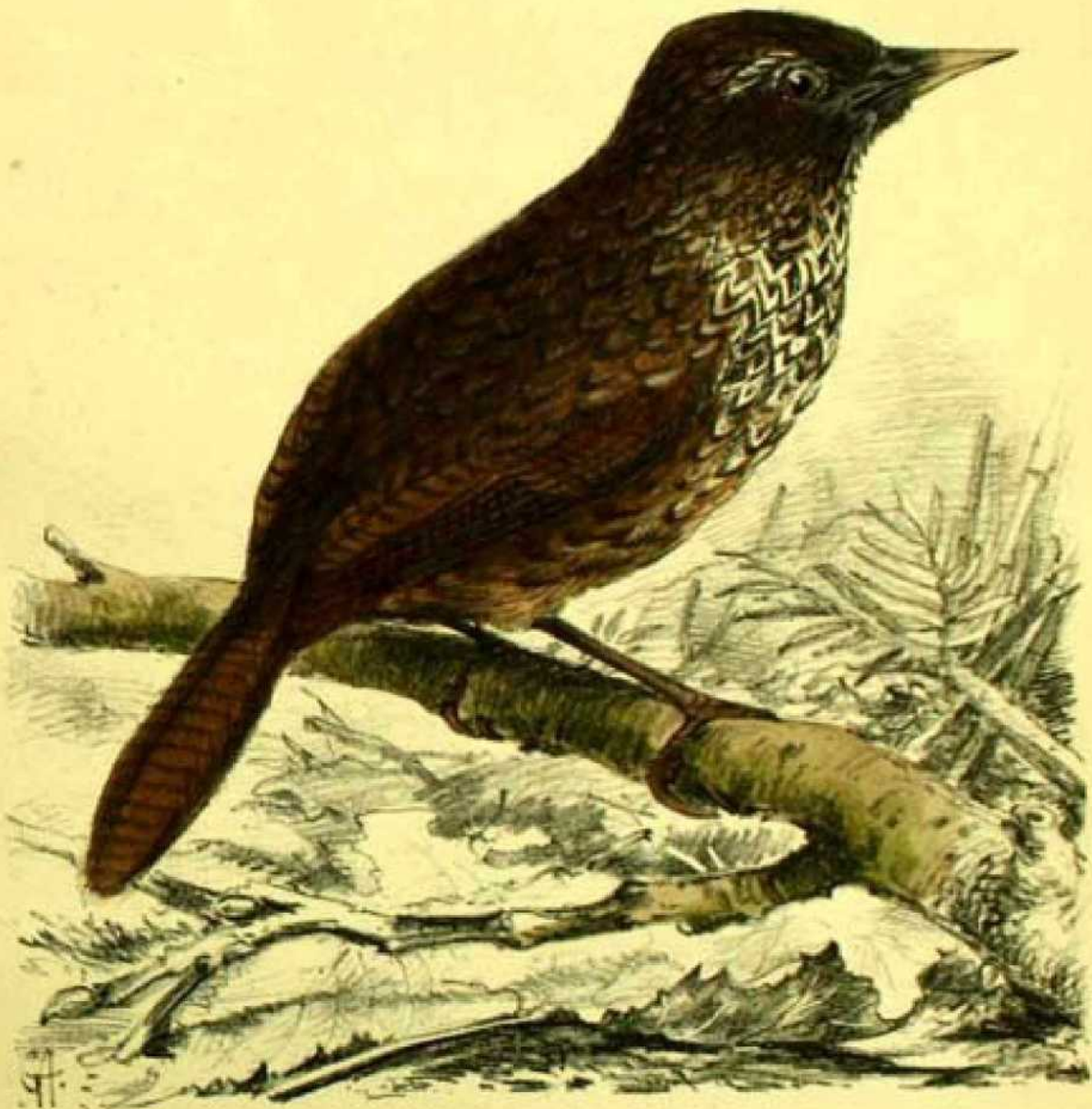


J. Smit del. et lith.

M. N. Hanhart imp.

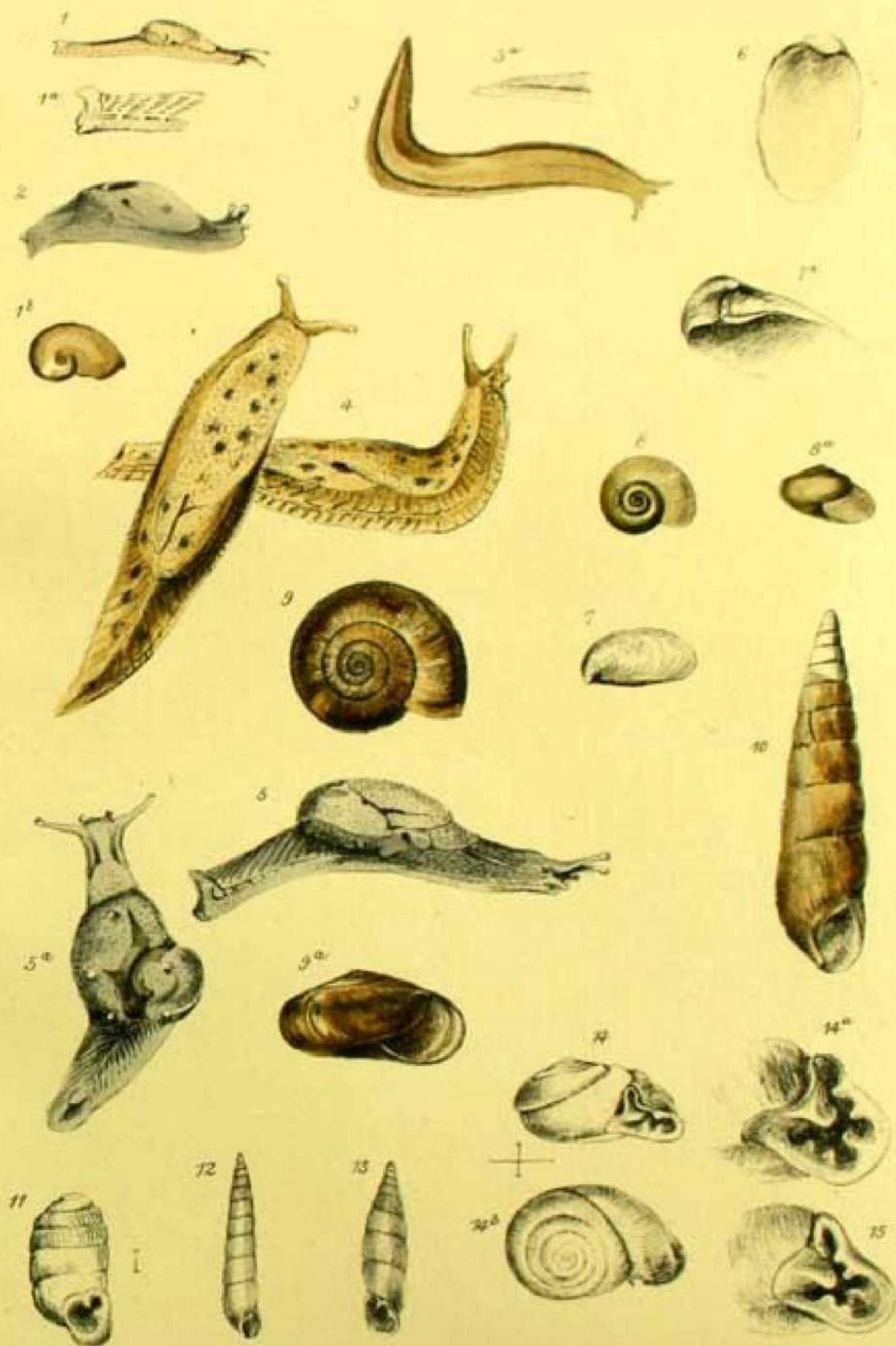
ACRIDOTHERES ALBOCINCTA.





SPHENOCICHLA ROBERTI





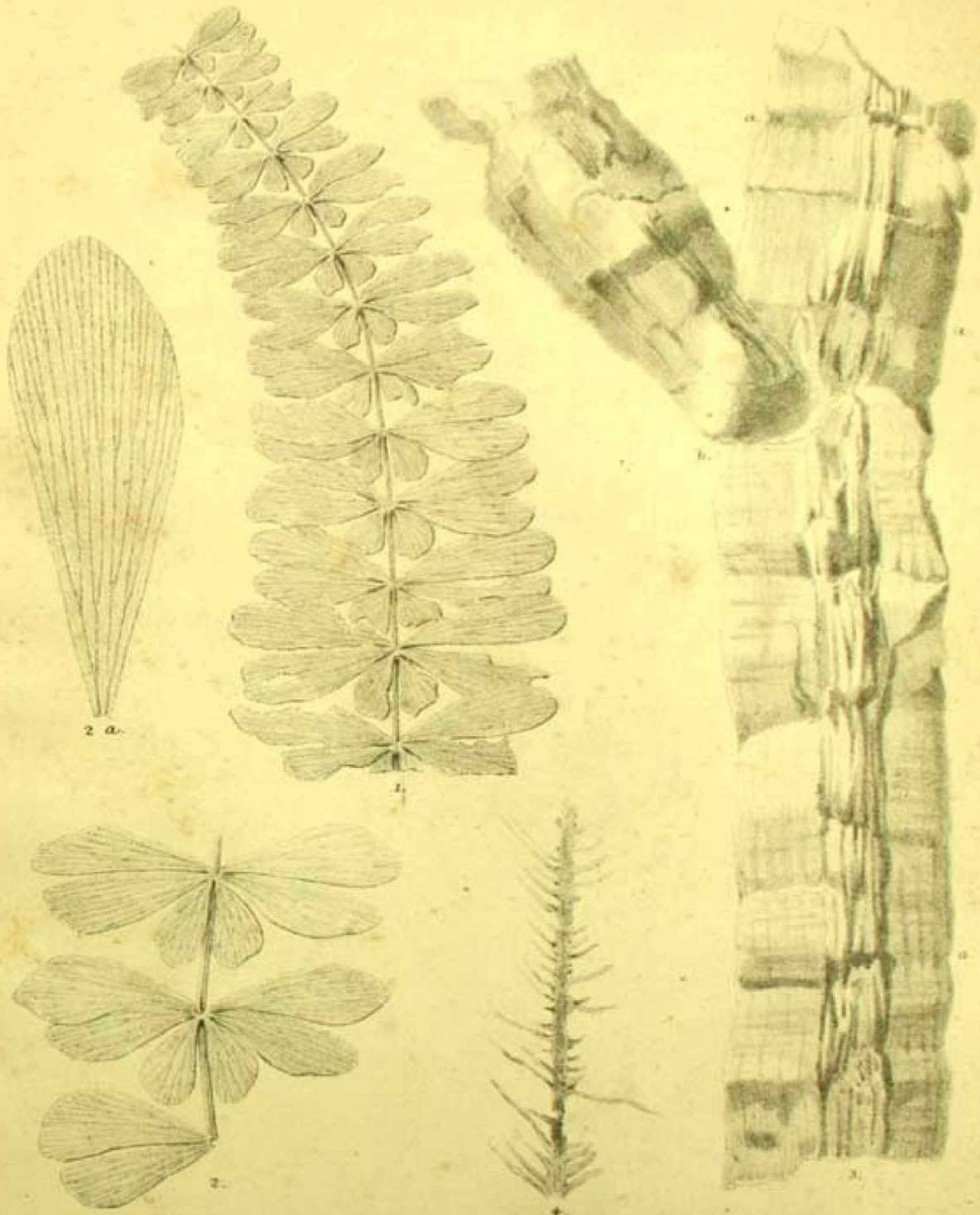
HELICACEA DAFIA HILLS ASSAM.





PYCTORHIS ALTIROSTRIS.





J. Schaumburg Lith.

FOSSIL PLANTS FROM RÁNIGANJ COAL-FIELD.

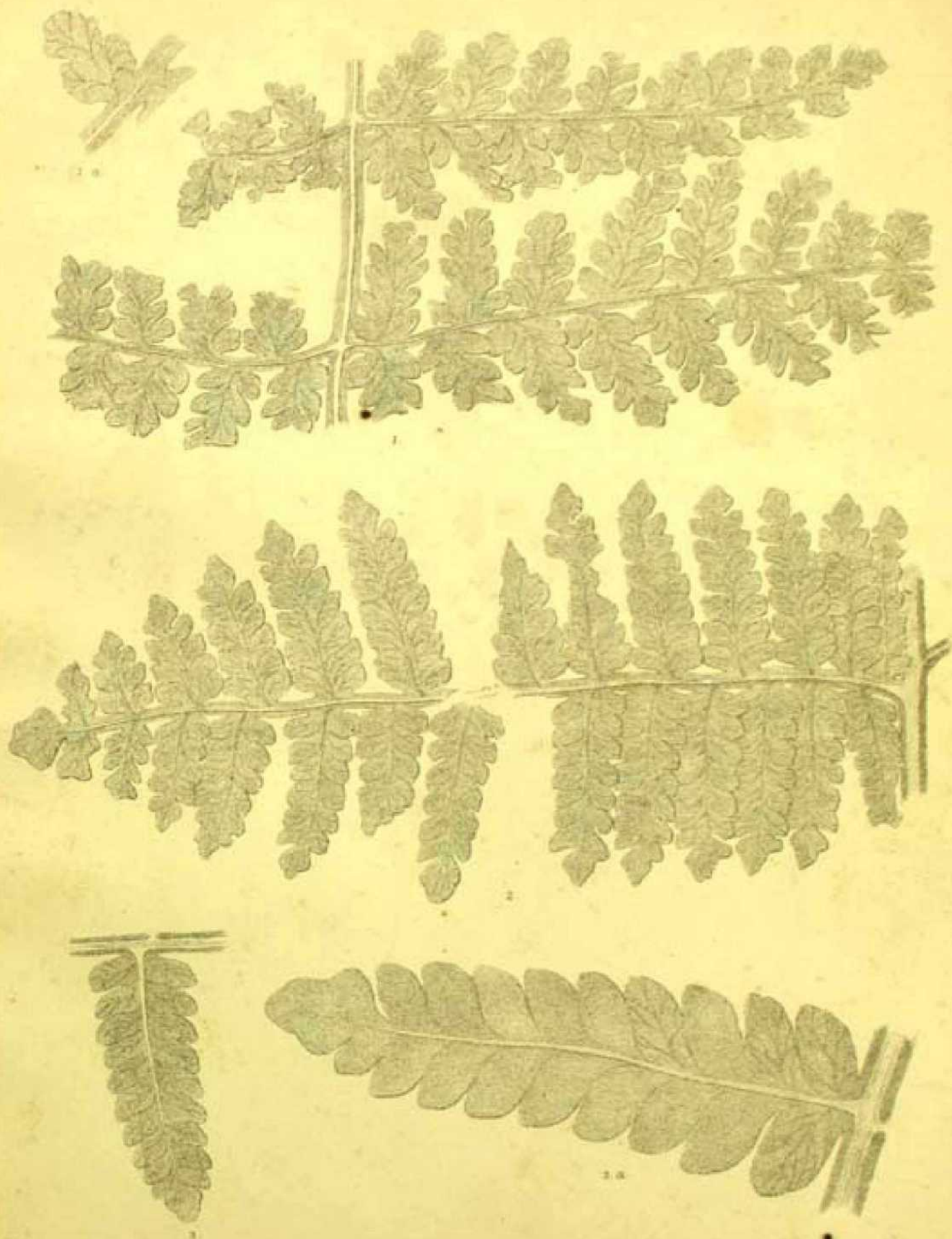




J. Schauburg lith.

FOSSIL PLANTS FROM RANIGANJ COAL-FIELD

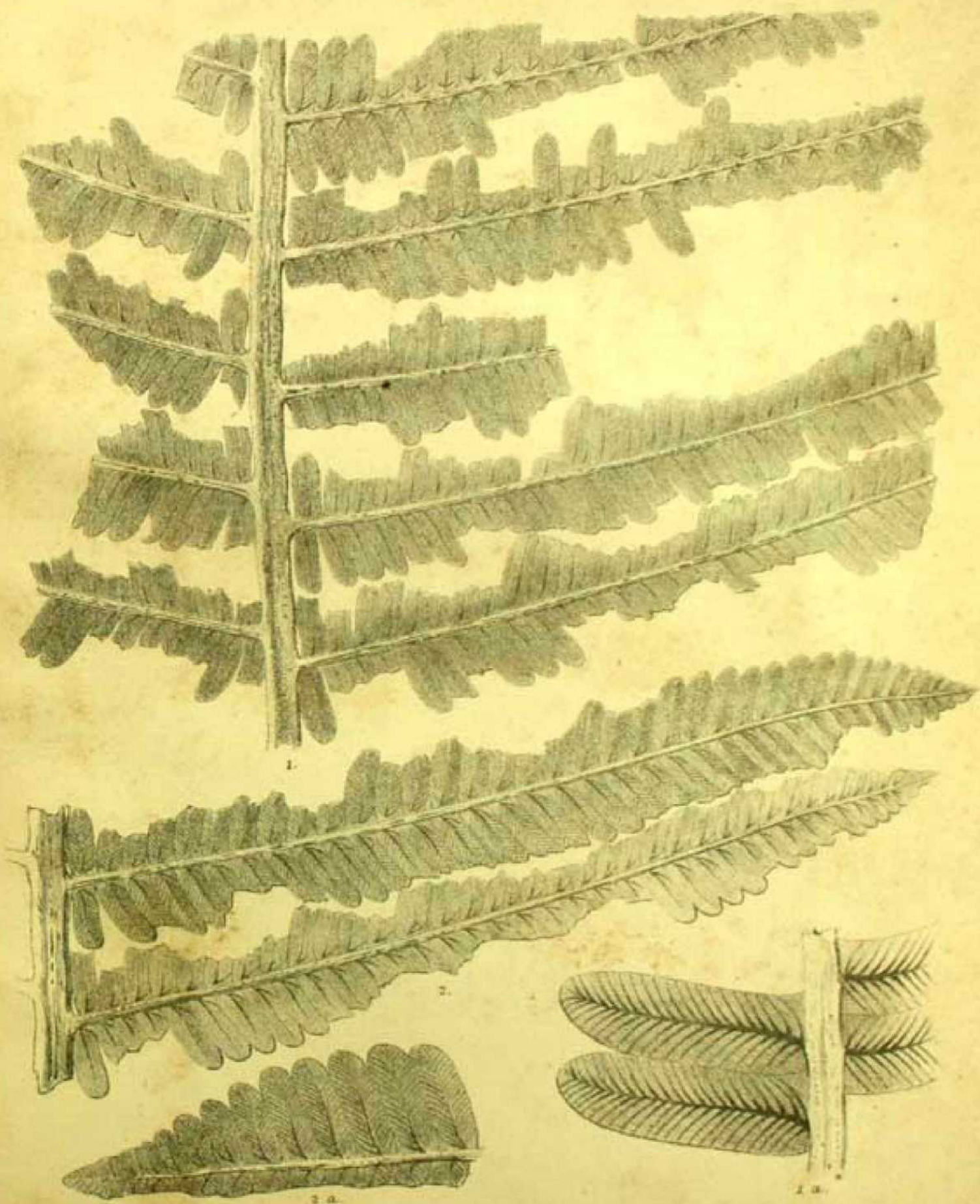




J. Schaumburg lith.

FOSSIL PLANTS FROM RANIGANJ COAL-FIELD.

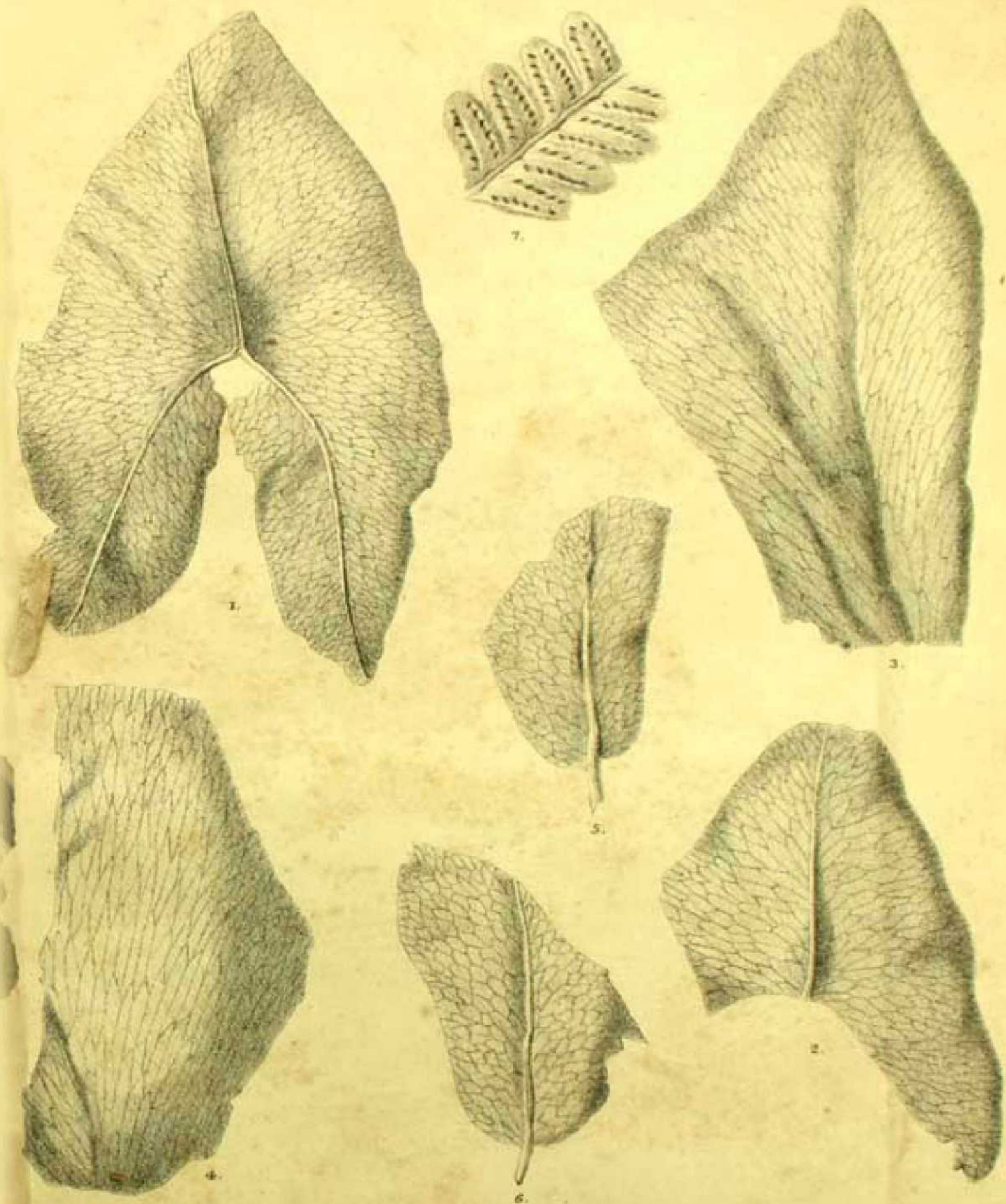




J. Schaumburg. Lith.

FOSSIL PLANTS FROM RANIGANJ COAL-FIELD.





J. Schaumburg, Lith.

FOSSIL PLANTS FROM RÁNIGANJ COAL-FIELD.